GB

trophy

INTRA-ORAL X-RAY SYSTEM

IRIX 70

USER'S MANUAL

Trophy constantly strives to improve its products and, therefore, reserves the right to deliver, without prior notice, machines whose characteristics differ from those described here; nonetheless, these machines are still guaranteed to comply with regulations in force.
All rights reserved.

WARRANTY CONDITIONS

It is the responsibility of the user to comply with current legislation concerning installation and operation of the equipment.

In the event of incorrect use or defective maintenance not complying with the recommended scheme, TROPHY or its representative shall not be liable for any deficiencies, physical damage, personal injuries or non conformity that may occur as a result.

The equipment must not be used if electrical, mechanical or radiation protection components are defective, or if the operations stipulated by the maintenance program have not been carried out.

Only TROPHY or third parties duly authorized by TROPHY may carry out modifications or add extensions to the installation and equipment.

Such modifications shall always be carried out in compliance with the regulations in force in the country of operation, and in compliance with normal trade practice.

If the power supply characteristics do not comply with the recommendations given in the Installation and Maintenance Manual section 4 Chapter II "Prior to Installation", the ***IRIX 70*** unit will not be able to provide maximum performance, and it will not be possible to guarantee normal operation.

You can obtain a complete technical file about the ***IRIX 70*** unit by simply requesting it from TROPHY.

TRANSPORTATION CONDITIONS

The goods are transported at the consignee's risk.
Any disputes as to losses or damage occurring during transportation must be stated in the presence of the haulier upon delivery, and must be noted on the delivery slip.

Under no circumstances shall packaging materials manufactured by TROPHY be used for any other purposes than transportation.

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Original language of document: FRENCH

DESCRIPTION OF THE SYSTEM

Your intra-oral X-ray system includes:

- An IRIX 70 generator which includes:
  - an oil bath transformer and X-ray tube
  - an aluminum filter which improves the beam quality and reduces the radiation dose received by the patient
  - a beam limiting device which restricts the beam diameter to approx. 6 cm on the skin and maintains a distance of 20 cm between the X-ray focal spot and the skin
  - an angular scale and a handle to facilitate positioning

- A CCX-Digital timer which includes:
  - an anatomy selector and digital display of exposure time
  - automatic compensation for mains voltage variations (± 20%)
  - a built-in microprocessor test, runs each time the unit is switched on
  - an alarm triggered by any incorrect operation
  - an "RVG" button which automatically adjusts the exposure time if you use an RVG (RadioVisioGraphy)

- A scissor arm:

  The scissor arm allows the generator head to be quickly and accurately positioned.
  It can be mounted:
  - on the wall, with an extension arm of 11-13/16, 23-5/8 or 31-1/2 in. (30, 60, or 80 cm)
  - on a mobile stand
  - on a floor-mounted column, with an extension arm of 11-13/16 in. (30 cm)
  - from the ceiling
  - on the dental unit, with an extension arm of 11-13/16 in. (30 cm)

☞ ***Note:*** *Some models have a standard arm instead of the scissor arm. This does not change their operation.*

USE OF THE UNIT

I. PATIENT POSITIONING

The patient should preferably be seated with the sagittal plane vertical (figure 1).

- ➢ Radiography of the upper maxillary: the nose-ear plane must be horizontal
- ➢ Radiography of the lower maxillary: the occlusal plane must be horizontal

FIGURE 1: PATIENT POSITIONING

II. GENERATOR POSITIONING

The scissor arm allows the generator to be accurately positioned for any type of exposure. The beam limiting device maintains a distance of at least 20 cm between the focal spot and the skin. Subsequently, either the paralleling technique (figure 2), or the bissecting technique (figure 3) can be used.

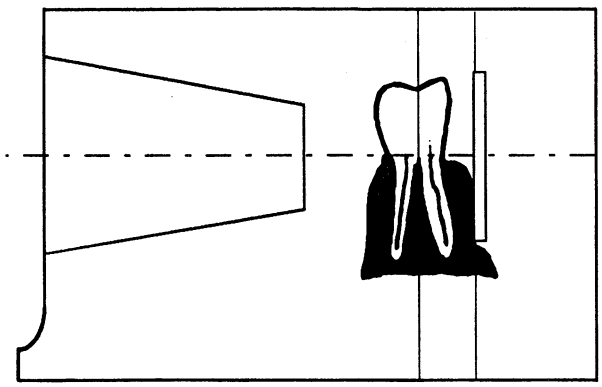


FIGURE 2: PARALLELING TECHNIQUE

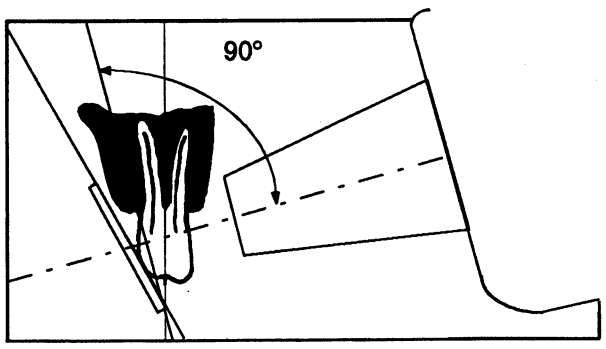


FIGURE 3: BISSECTING TECHNIQUE

III. FILM POSITIONING

Place the face of the film with no label against the area to be examined.

- **Bissecting technique:**
  Place the film and generator as shown in figure 4 (the beam is perpendicular to the line which bisects the angle between the tooth and film). The patient holds the film in position with his thumb, keeping his other fingers out of the beam.

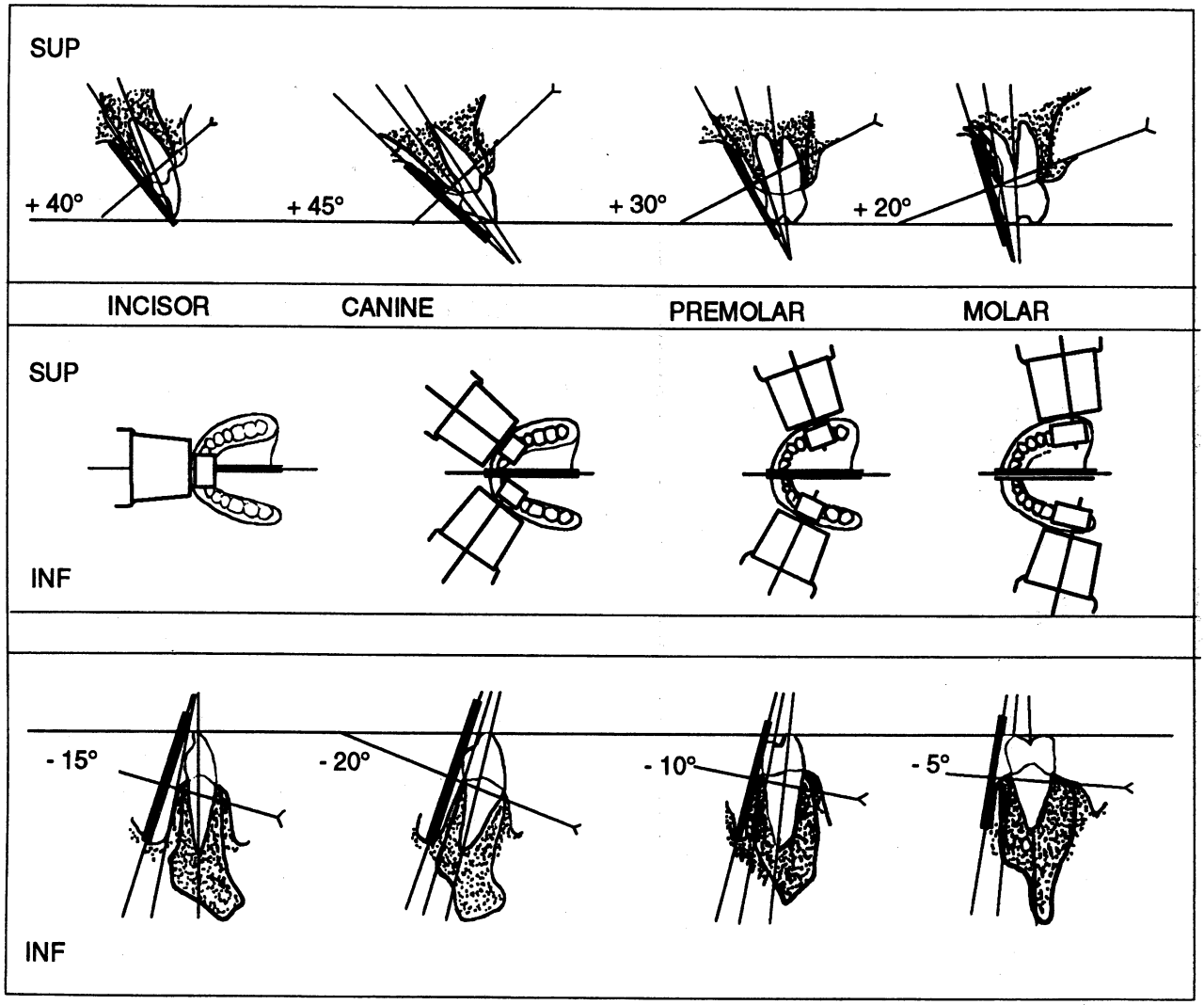


FIGURE 4: FILM POSITIONING

Bissecting technique

- **Paralleling technique:**
  Place the film and generator as shown on figure 5 (the beam is perpendicular to the film). In this case, a film-holder should be used.

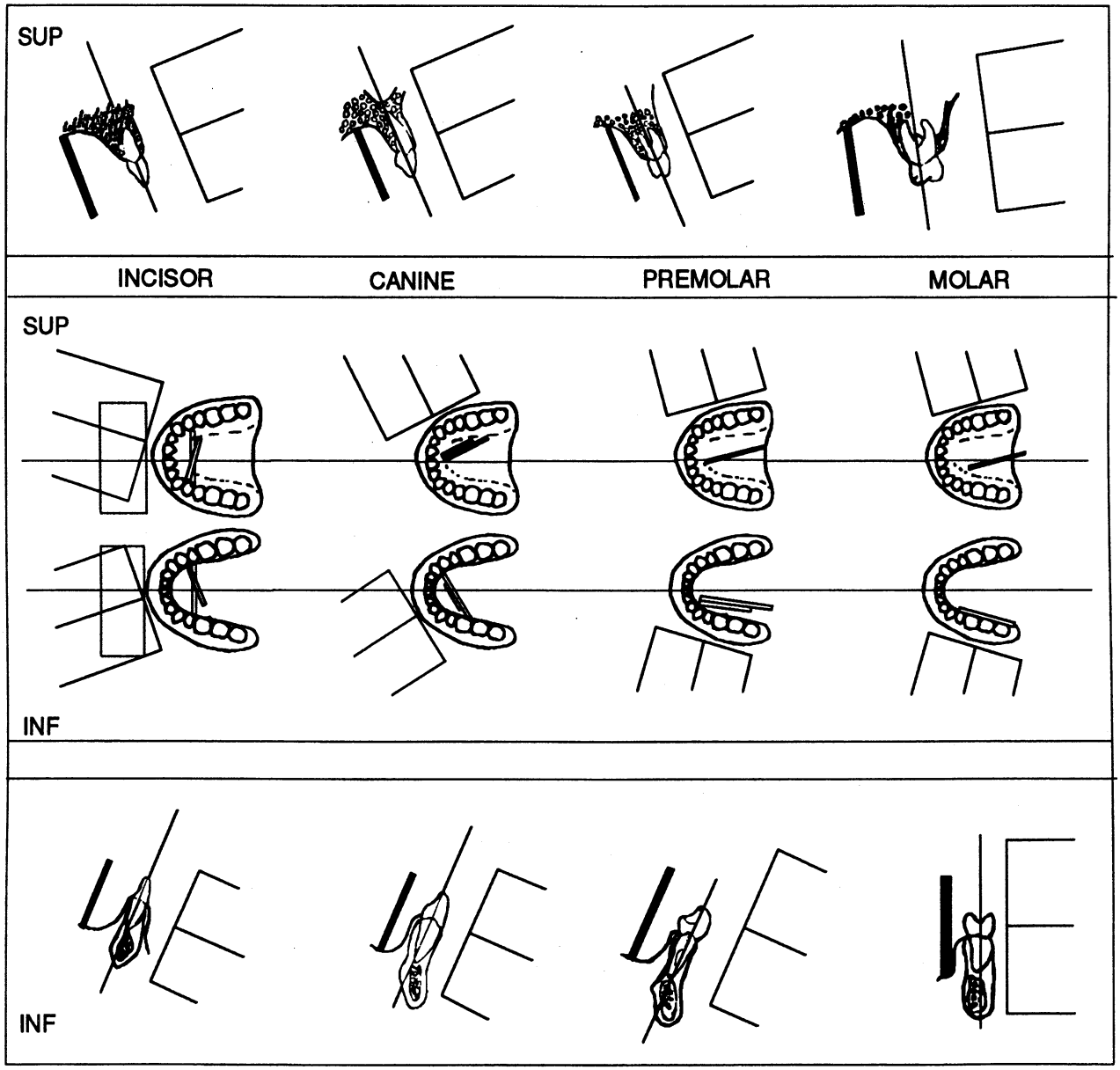


FIGURE 5: FILM POSITIONING

Paralleling technique

❑ **Occlusal films**

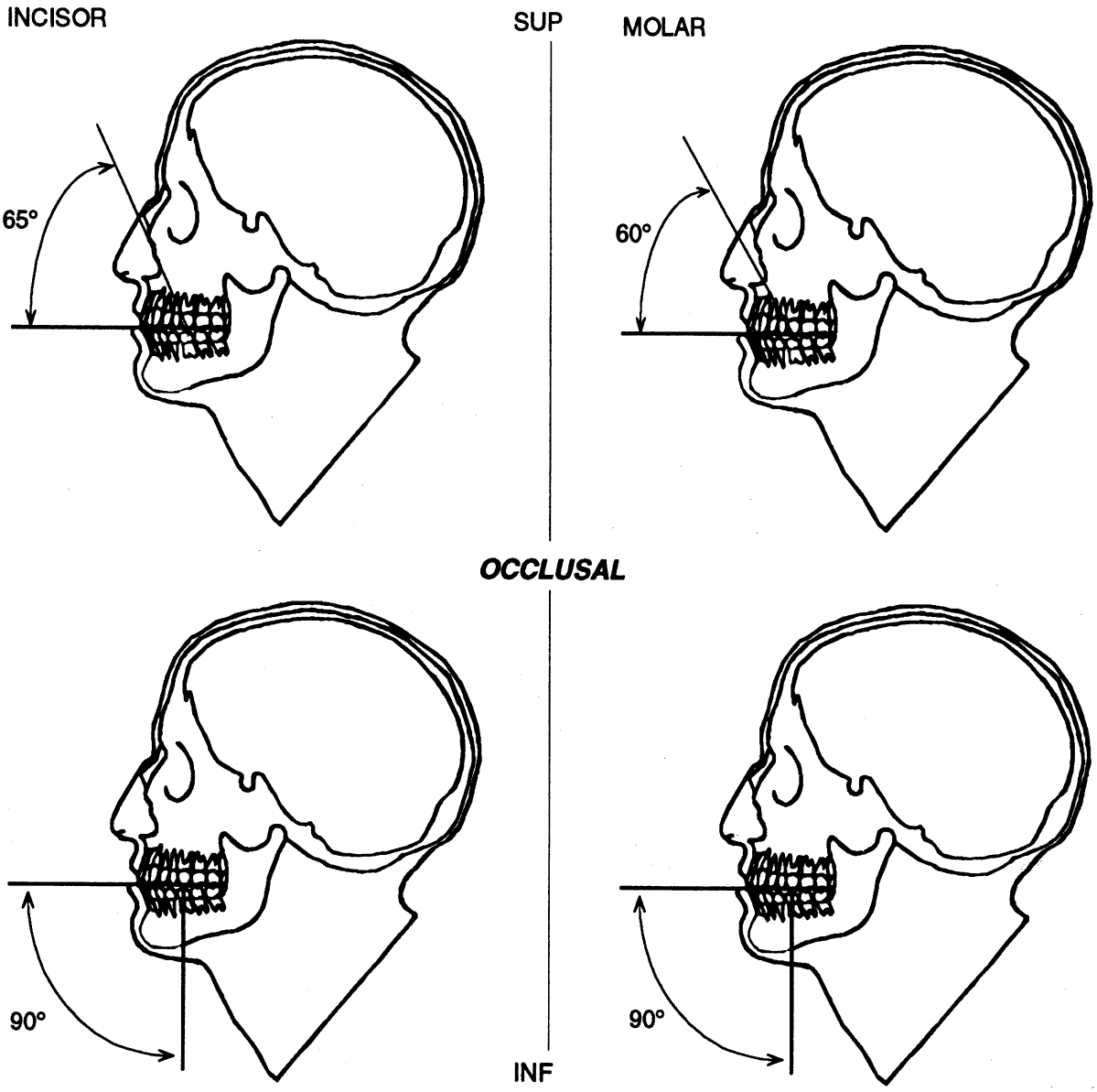


FIGURE 6: FILM POSITIONING
Occlusal pictures

❑ **Bitewing films**

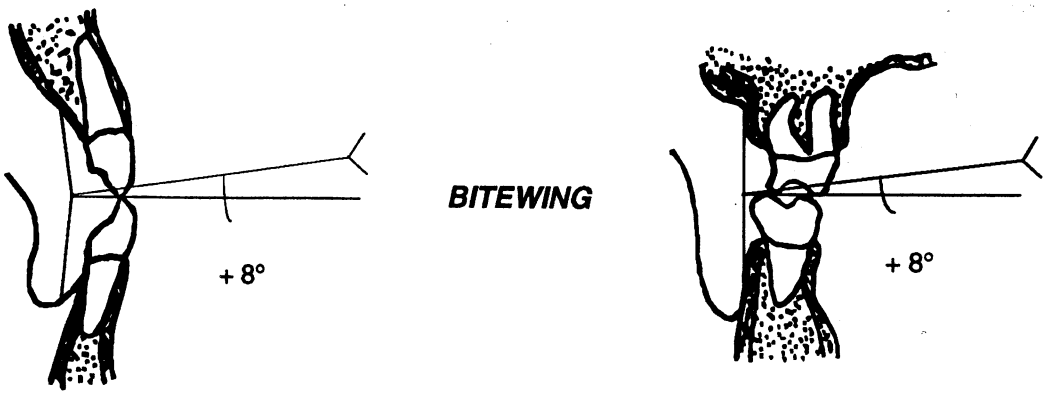
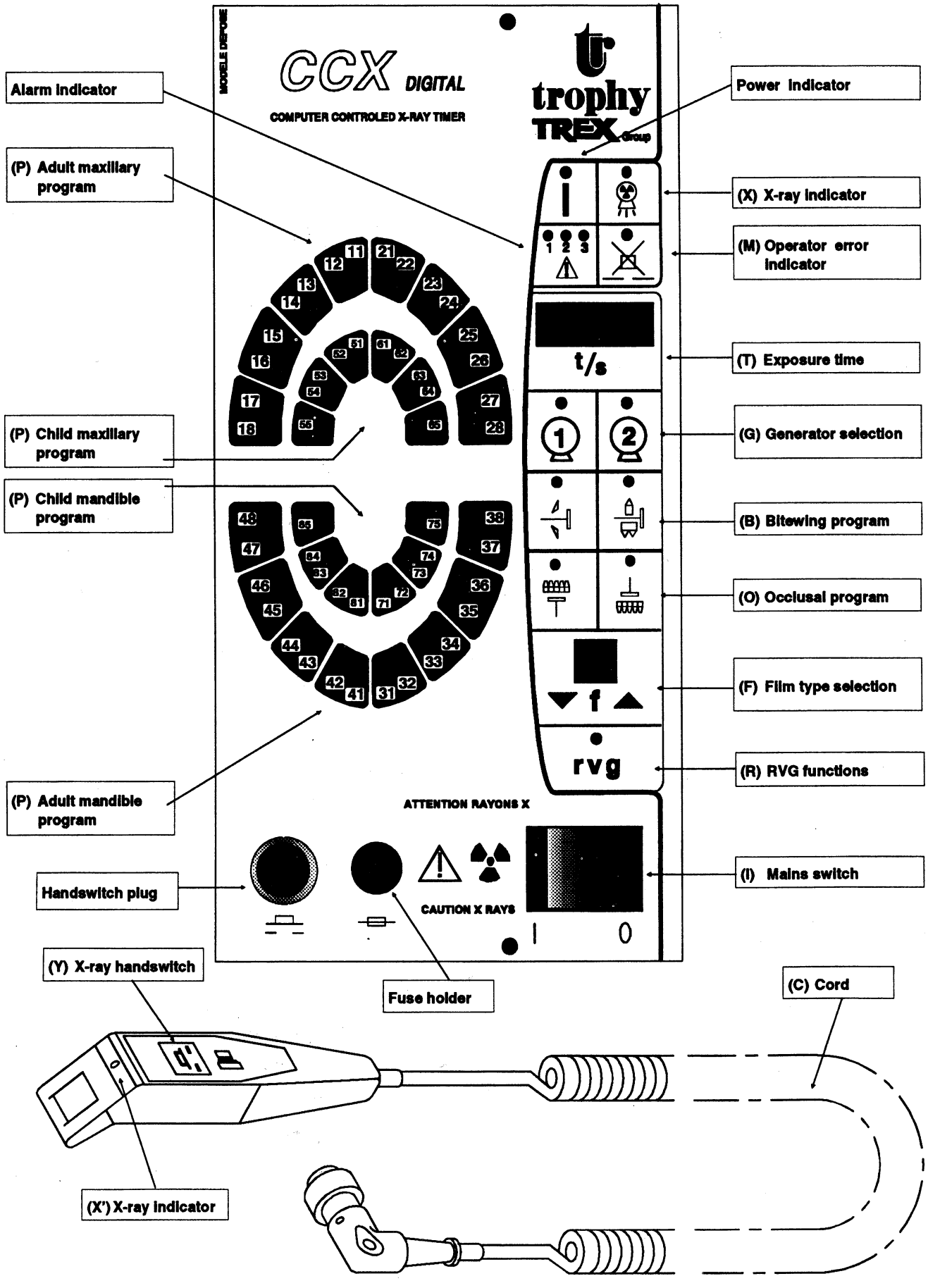


FIGURE 7: FILM POSITIONING
Bitewing pictures

FIGURE 8: CCX-Digital TIMER



IV. PREPARING THE TIMER AND TAKING AN X-RAY

- Switch the timer on: the "power" indicator and the following come on:
  - a selected tooth or special exposure and the corresponding exposure time
  - the exposure mode (RVG or film)
  - the generator selected (1 or 2)
  - the type of film selected (1 to 9)

- Program the timer:
  - select the generator to be used (key G)
  - select the desired tooth (key P). This automatically selects the exposure time after compensation for the mains voltage; the time indicated may vary slightly if the mains voltage is not stable.
  - select the exposure mode (RVG or film) to suit the peripheral equipment (key R):
    - Film: light off
    - RVG: light on
    - Other mode: light flashing
  - Select the film type as indicated in table IV page 14 (key F). This selector can also be used to compensate for the patient's size:
    - Large patient: increase the film type
    - Small patient: reduce the film type
    - For the australian version:
      Press tooth keys 71/72 and 41/42 and increase film type key
      or
      Press tooth keys 81/82 and 43/44 and decrease film type key
      respectively

- Start the exposure:
  - press the handswitch (Y): the X and X' indicators on the CCX-D and on the handswitch come on and a buzzer sounds.
  - keep the handswitch depressed until X and X' indicators go out and the buzzer stops.

CAUTION:

An operator error (M) will be triggered if the handswitch is released before the end of the exposure. This indicates that the X-rays have been stopped prematurely and that your film will be underexposed. The digital display then indicates how much of the selected exposure time has not been used. The alarm can be stopped by reselecting a tooth on the timer.

V. ADDITIONAL CHARACTERISTICS OF THE TIMER

- The timer automatically corrects the exposure time to allow for variations in mains voltage (± 20 %). The image contrast is, therefore, correct even if the mains supply varies.

- The CCX-Digital timer includes a temperature safety device to prevent overheating the generator and thus to increase its life. This safety device imposes a certain rest period between two consecutive exposures, which is calculated from the last exposure parameters and the time elapsed between exposures.

  In normal use, this security will be transparent to the user. The timer will only impose a rest period after long, repeated exposures (the tooth selected then flashes).

- The CCX-Digital timer displays a count-down of the exposure time while the X-ray is being taken.

  If the exposure is interrupted (for example by releasing the handswitch), the operator error (visible and audible) is triggered and the remaining exposure time is displayed. This information helps decide whether to develop the film or immediately take another X-ray.

  The operator error stops when a tooth is selected again.

- The timer includes a self-test function, activated as follows:
  - switch the timer off
  - press the RVG key and, at the same time, switch the timer on
  - release key RVG as soon as the tooth 41/42 lights up

  All timer indicators are tested one after another except alarm number 3 and X-ray emission. The generator selection relay, audible alarm and digital displays are also tested.

  At the start of the test, the unit displays the number of exposures taken since first being put into service, as follows:
  - the film type display indicates the tens of thousands of exposures
  - the exposure time display indicates the thousands, hundreds, and tens

  example: "0 004" indicates between 40 and 50 exposures
  "0 204" indicates between 2,040 and 2,050 exposures
  "4 123" indicates between 41,230 and 41,240 exposures.

  The total counter capacity is therefore 99,999 exposures.

FILM DEVELOPMENT

I. MANUAL DEVELOPMENT

Refer to the user manual of your film processor.

II. AUTOMATIC DEVELOPMENT

Care must be taken in developing films to obtain good quality X-rays.

① Remove the film from its package in a darkroom, taking care to avoid fingerprints or nail marks.

② Dip in a developer bath and agitate slightly for a few seconds; leave it in the bath for 5 min at 20°C, 6 min at 18°C, or 4 min at 22°C.

③ Rinse it in running water for approx. 20 seconds.

④ Dip it in the fixer bath, agitating it for a few seconds and then leave it for at least 5 min in the bath.

⑤ Wash it in running water. Wash the film for quite some time to ensure it can be correctly conserved.

⑥ Allow it to dry in dry open air, protected from dust.

Steps ⑤ and ⑥ can be done in normal daylight.

It is important to use fresh baths with the correct concentration; do not add developer to increase the bath concentration, since this will increase the contrast but reduce sharpness.

MAIN REASONS FOR POOR X-RAYS

FILM	Exposure time	Development time	Bath quality	Position
underexposed	too short	too short	too cold	
overexposed	too long	too long	too hot	
insuff. detail		too short	too cold or exhausted	
fuzzy				the patient moved
off-center				incorrect tubehead or film positioning

TECHNICAL CHARACTERISTICS

I. TECHNICAL CHARACTERISTICS ACCORDING TO IEC STANDARD 601-2-7

Manufacturer

TROPHY RADIOLOGIE
4, rue F. Pelloutier - Croissy-Beaubourg
77437 MARNE-LA-VALLÉE CEDEX2 - FRANCE

Models

Dental X-ray diagnosis devices, class 1, type B, intermittent use with protection against radiation risks according to IEC standard 601-1-3 (1994).

IRIX 70

Electric power supply

Power absorbed 900 VA

230 - 240 V AC (± 10%), 50 Hz, 4 A, apparent resistance 0,5 Ω
Permanent current 0.05 A
Current during X-ray emission 4 A

110 - 130 V AC (± 10%), 50/60 Hz, 8 A, apparent resistance 0,2 Ω
Permanent current 0.1 A
Current during X-ray emission 8 A

Rated high voltage and maximum corresponding current 70 kV/8 mA

Current/voltage combinations for a maximum output power of 414 W
- with a form factor of .74 70 kV/8 mA

Rated power for exposure time of 0.1 s with 70 kV/8 mA 414 W

Reference time/voltage product

kV	mA	s	mAs
± 10%	± 15%	± 10%	
70	8	0,1	0,8

Rate of use

At 70 kV, 8 mA and 0.1 s and at the maximum tank temperature: one exposure every 13 seconds.

Minimum value of the current/time product in the range of conformity: 0.48 mAs at 8mA

Applicable range of load parameters

Due to the mains frequency and for exposure times lower than 0.063 s, some values of the R'10 series do not exist. Mains variation compensation for these values is not correct.

Area of conformity to the IEC standard 601-2-7

- Reproducibility of the emitted radiation conform
- Linearity of the emitted radiation conform
- Precision in radiography conform

Measurement conditions

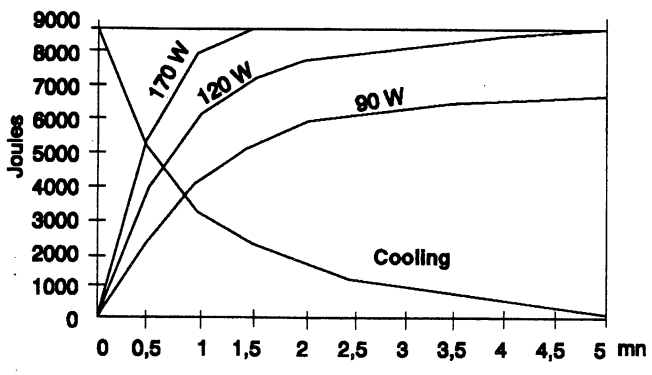
- kV: direct measurement using a peak kilovoltmeter
- mAs:direct measurement in the circuit using a mAsmeter
- Exposure time:measurement of the number of peak higher than 20% of the maximum dose current using a dosemeter

Dimensions and weight

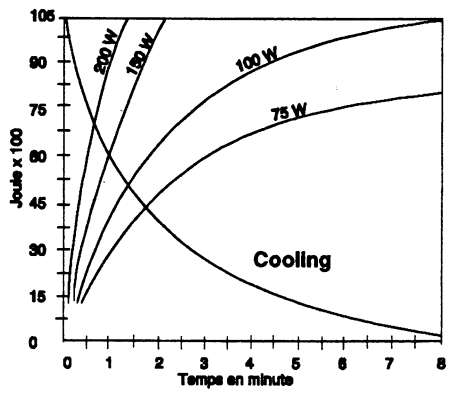
Timer unit	4-5/16 x 5-13/16 x 11-5/8 in. 110 x 145 x 295 mm	5.95 lb 2.7 kg
X-ray emitting unit	5-1/2 x 7-7/8 x 15-9/16 in. 140 x 200 x 395 mm	17.63 lb 8 kg
Scissor arm	2-3/8 x 5-5/8 x 34 in. 60 x 135 x 865 mm	26.45 lb 12 kg

II. MAIN CHARACTERISTICS OF THE X-RAY GENERATOR according to standard EN 60601-2-28

Manufacturer and type of X-ray tube	TROPHY Type TRX 708	CEI Type OCX / 65-G
Rated high voltage	70 kV	70 kV
Rated anodic power	490 W	490 W
Maximum heat accumulated in the anode	8 700 J	10 000 J
Rated value of focal spot (IEC 336/1982)	0.7 mm (.027 ")	0.7 mm (.027 ")
Target materials	Tungsten	Tungsten
Target slope	19 °	19 °
Filtration due to fixed materials	0.6 mm (.023 ") eq. Al	0.6 mm (.023 ") eq. Al



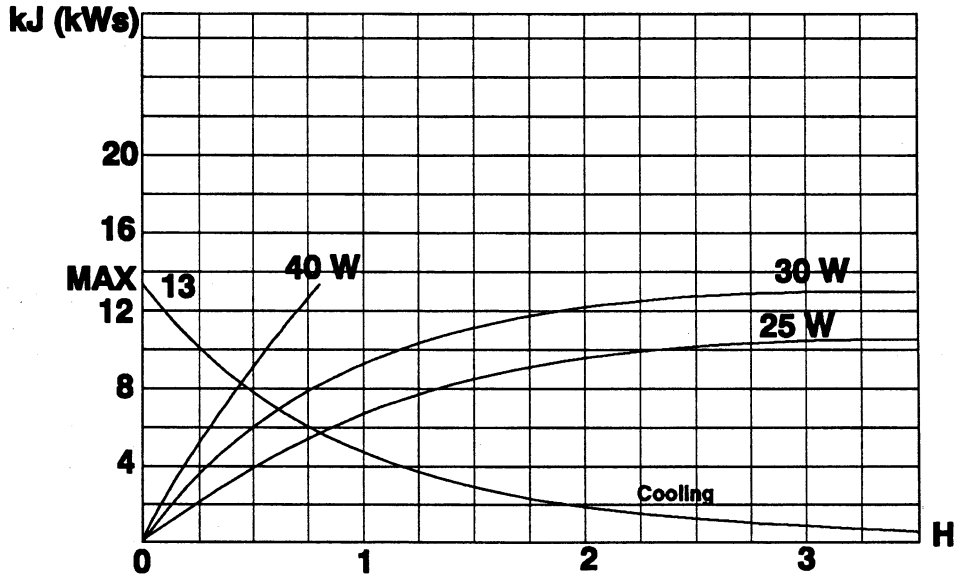
TROPHY tube type TRX 708



CEI tube type OCX / 65-G

Equipped X-ray generator

IEC standard 601-2-28	conform
Type of protection against electric shocks	Class I
Degree of protection against electric shocks	Type B
Rated value of inherent filtration at 70 kV	1.0 mm (.059 ") eq. Al
Rated value of additional filtration at 70 kV	1.5 mm (.039 ") eq. Al
Rated value of total filtration at 70 kV	2.5 mm (.098 ") eq. Al
Beam limiting cone, focal spot/skin distance	20 cm (7-7/8 in.)
Maximum accumulated heat	13,000 J
Maximum continuous thermal dissipation	30 W
Leaking radiation for a maximum rate of use at 414 W for one hour	< 0.25 mGy
Maximum field of symmetrical radiation	2-3/8 in. (6 cm) diameter
Safety thermal switch temperature	66 °C



Heating and cooling curves of the X-ray tank

III. EXPOSURE TIMES FOR DIFFERENT PROGRAMS (film type 6 and nominal voltage)

PROGRAM	SELECTION	ANGLE	TIME (sec)
ADULT	42 - 41 - 31 - 32	- 15	.220
	44 - 43 - 33 - 34	- 20	.220
	46 - 45 - 35 - 36	- 10	.220
	48 - 47 - 37 - 38	- 5	.260
	12 - 11 - 21 - 22	+ 40	.260
	23 - 24 - 13 - 14	+ 45	.260
	25 - 26 - 15 - 16	+ 30	.340
	27 - 28 - 17 - 18	+ 30	.380
CHILD	82 - 81 - 71 - 72	- 15	.140
	83 - 84 - 73 - 74	- 20	.140
	85 - 75	- 10	.140
	52 - 51 - 61 - 62	+ 40	.180
	63 - 64 - 53 - 54	+ 45	.180
	55 - 65	+ 30	.220
BITEWING	canines-incisors	+8	.220
	molars	+8	.260
OCCLUSAL	maxillary		.600
	mandible		.600

IV. CHOICE OF FILM TYPE

MANUFACTURER	MODEL	FILM TYPE
KODAK	Ekta Speed	3
KODAK	Ekta Speed Plus	3
AGFA	Dentus M4	3
DENTAL UNION	Bleu Star	3
AGFA	Dentus M2	5
AGFA	Normal	6
DUPONT	Lightning fast	6
GEVAERT	Dentus Ultra Rapid	6
KODAK	Ultra Speed	6
RINN	Super Fast	6
MINIMAX	Intermediate	8
RINN	Extra Fast	9

V. FILM TYPE CORRECTION FACTORS

POSITION	VARIATION	FACTOR
0	- 73%	0.27
1	- 67 %	0.33
2	- 59 %	0.41
3	- 49 %	0.51
4	- 36 %	0.64
5	- 20 %	0.80
6	0	1
7	+ 25 %	1.25
8	+ 56 %	1.56
9	+ 95 %	1.95

VI. TROUBLESHOOTING

SYMPTOM	CAUSE	CORRECTIVE ACTION
No lights come on	unit disconnected	connect the unit
	fuse blown	replace the fuse
	main switch "OFF"	set switch to"ON"
No X-rays emitted	the generator is cooling	wait for the selection light to stop flashing
	handswitch disconnected	connect the handswitch
	handswitch out of order	replace the handswitch
Exposure cycle OK, but film too light or too dark	incorrect film type	see film type selection table
	generator incorrectly positioned	position it correctly
	wrong exposure time	correct the exposure time
	development too short or too long	see instructions on development
	developer too cold or too warm	adjust temperature
	developer too old	change it
	RVG key incorrectly activated	switch to proper mode
	film back-to-front	see "film positioning" section
	incorrect installation	call in a service technician
Operator alarm with audible warning	handswitch released before exposure time elapsed	select a tooth to stop the alarm, then repeat the exposure
Alarm N°1, 2 or 3 and audible warning	microprocessor has detected a problem	call in a qualified technician

☞ ***The timer must be switched off to stop an N°1,2 or3 alarm.***

PREVENTIVE MAINTENANCE

This unit has been designed to be easy to use and to provide maximum diagnostic capabilities.

To guarantee a correct and safety working of this unit, preventive maintenance has to be done on a first level every year and on a second level every two years.

It is the responsability of the user to control the maintenance schedule.

Contact your authorized Trophy dental representative who will give you a maintenance certificate, dated and signed, with the detailled controls and repairs done.

I. FIRST LEVEL MAINTENANCE - YEARLY

① Generator

- ➢ check that the certification label is intact
- ➢ check that there is no oil leakage
- ➢ check that the beam limiting device is correctly attached to the generator and maintains a distance of at least 20 cm between focal spot and skin
- ➢ check that the black plastic locking collar which attaches the generator to the arm is correctly positioned and the screw is tight (if incorrectly attached, the generator could fall and cause injury).

② Support and scissor arm

- ➢ check that the wall bracket is securely attached to the wall (or ceiling, floor or unit as appropriate). Alternatively, check that the mobile stand on which it is mounted is stable.
- ➢ check the scissor arm in all positions and adjust it if necessary
- ➢ if your scissor arm is making any noise, call your TROPHY representative for a quick intervention
- ➢ if the rotation of your generator is difficult, call your TROPHY representative for a quick intervention
- ➢ For an installation with an extension arm of 31-1/2 in., check that the 360 ° rotation of the scissor is retricted by the stops mounted on the extension arm to prevent the cables being ripped out.

③ Timer

- ➢ make sure the label is clearly visible
- ➢ check the condition of the handswitch and its cord
- ➢ Switch the timer on.
- ➢ Check that the green "power" light comes on.
- ➢ Select tooth 27-28 and type 5 film and then trigger exposure.
  Check that the "X-ray" light comes on during exposure, the counter automatically decrements to zero and the audible signal stops at the end of X-ray emission.

- ➢ Trigger an exposure and check that the red "operator error" light comes on and that an audible signal, different to the previous signal, sounds when the handswitch button is released before the end of exposure since. In normal use, the handswitch button must be kept pressed until the end of the exposure.

④ Self-test

- ➢ Switch the timer off.
- ➢ Press RVG button and simultaneously switch the timer on.
  Wait for tooth 41-42 to lit before releasing the RVG button.
  All the timer functions and lights will automatically be tested (except the "X-ray" indicator light and alarm light no. 3 which indicates a microprocessor alarm; these functions are tested but the lights do not come on).
  A short audible signal is generated at the end of the test cycle.

If any of the lights or the audible signal does not work, contact your TROPHY representative.

⑤ Electrical installation

- ➢ check that all grounding points are correctly connected
- ➢ check that the main voltage is within the limits given in the installation manual

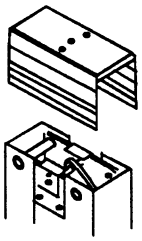
☞ ***After completing this preventive procedure, check that your* user's manual *is available close to the unit.***

☞ ***If the results of any of these checks are unsatisfactory, call a qualified technician from your TROPHY representative for corrective action.***
In the meantime, it is strongly recommended to not use the unit.

II. SECOND LEVEL MAINTENANCE - EVERY TWO YEARS

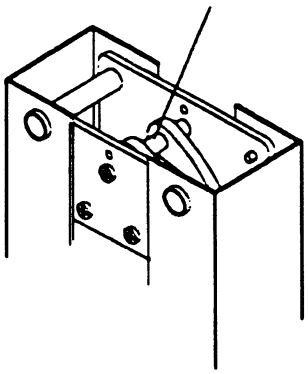
☞ ***This maintenance must be done by a qualified technician from your authorized TROPHY distributor.***

☞ ***If the results of any of these checks are unsatisfactory, call a qualified technician from your TROPHY representative for corrective action.***
In the meantime, it is strongly recommended to not use the unit.



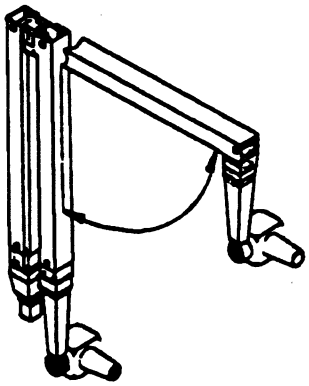
① Central axis wear check

➢ Remove the central plastic cover.



➢ Check that the axis does not roll when moving the arm as shown aside.

➢ If the axis rolls or the movement is noisy, this is an indication of a wear which can cause the genetor to fall down.



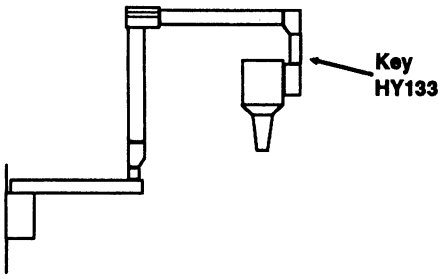
☞ ***An exchange of the complete arm has to be done as soon as possible.***

② Arm balance and spring tension

➢ Check that the arm is flexible in all positions and that it remains immobile when no longer handled.

➢ In case of problem, adjust the spring tension as requested.

③ Generator rotating contact



➢ Set the arm as shown aside.

☞ ***Never use an other arm position.***

➢ Remove the plastic key HY133 fixing the generator on the arm.

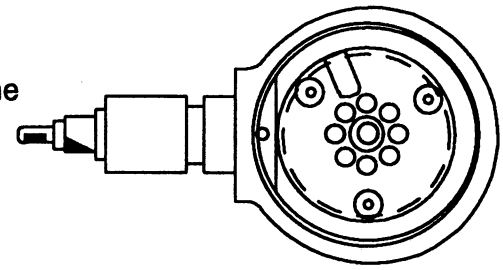
➢ Remove the generator.

☞ ***If there is a problem when removing the generator, exchange the complete assembly arm and generator.***

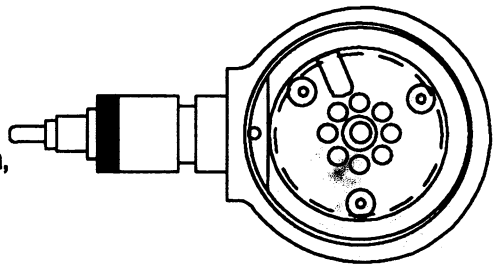
➢ Using alcohol clean the contacts of the generator and its pivot.

➢ Check carefully the following:
NOTE: the black parts on the drawings indicate the concerned parts.

- Black marks on the contact



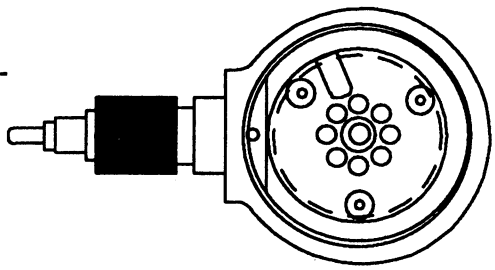
- Seizing marks on the pivot



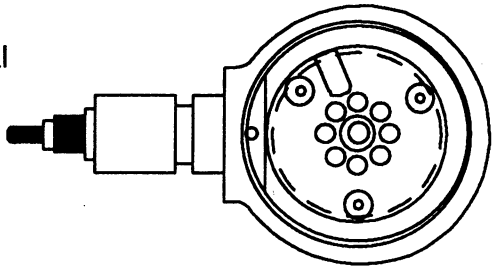
➢ In case of seizing,

- Clean carefully using emery cloth, 180 grain, until the marks desappear.

➢ Slightly grease the pivot using high quality mechanical grease, WYNN's HP type.



➢ Slightly grease the contacts using a special 1,000 V grease.
This grease is available from TROPHY.



➢ Using alcohol clean carefully the inner part of the arm.

➢ Remount the generator. Carefully set the key.

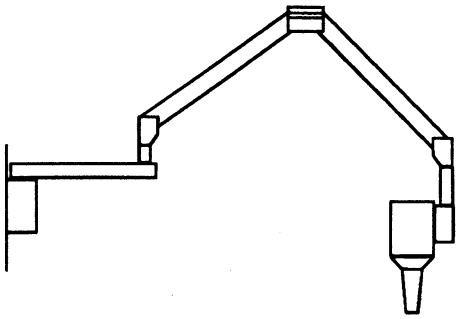
➢ Check if the generator moves smoothly.

④ Generator power supply cable

- ➢ Ckeck the cable for wears and tears, overall at the articulation points of the arm.
- ➢ In case of problem, change the cable.

⑤ Extension arm's horizontality

- ➢ Set the scissor arm in the position shown aside. The arm half extended must remain in the same position during its horizontal rotation movement
- ➢ In the same starting position, using a spirit level placed on the extension arm, check the arm's horizontality during its horizontal rotation.



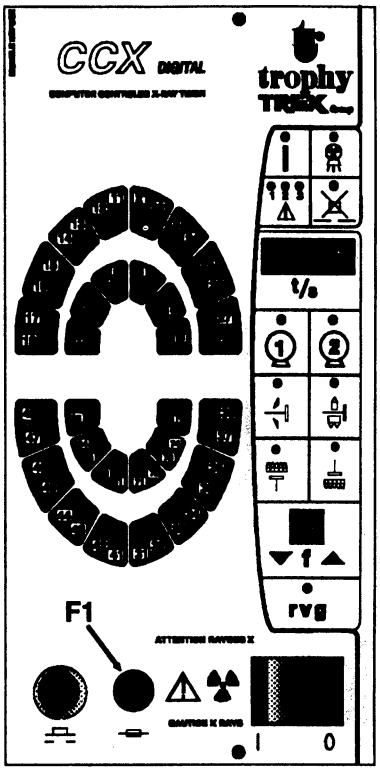
☞ ***In case of problem, remove the generator and verify all the mounting procedure, see Installation and maintenance manual.***

⑥ Wall bracket mounting

- ➢ Placing and moving the arm in the worse conditions, fully extended and complete rotation, check that the wall bracket remains stable on the wall.

☞ ***In case of problem, remove the generator and verify all the mounting procedure, see Installation and maintenance manual.***

III. FUSES EXCHANGE

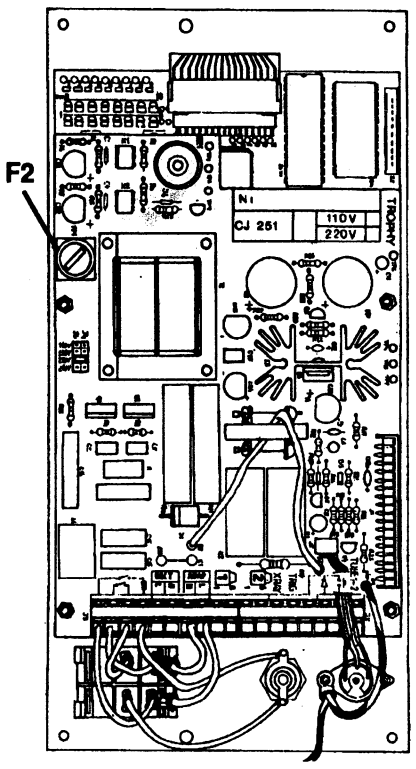


❑ Switch off the timer and remove the main plug or switch off the main circuit breaker.

❑ **Timer front panel fuse F1**

Power circuits fuse
110 - 130 V : 10 A ; 6,3 x 32
230 - 240 V : 6.3 A ; 5x20

➢ Using a screwdriver, remove the fuse cap.
➢ Remove the defective fuse.
➢ Insert a new fuse, exactly the same type.
➢ Screw again the fuse cap.



❑ **CJ251 PCB fuse F2**

Control circuits fuse
110 - 130 V : 250 mA ; 5 x20
230 - 240 V : 130 mA ; 5x20

➢ Remove the cover of the wall bracket using an Allen key 3 mm (.12 in.)
➢ The fuse is located on the board.
➢ Using a screwdriver, remove the fuse cap.
➢ Remove the defective fuse.
➢ Insert a new fuse, exactly the same type.
➢ Screw again the fuse cap.
➢ Remount the wall bracket cover

NOTES

trophy

4, rue F. Pelloutier - Croissy-Beaubourg
77437 MARNE-LA-VALLÉE Cédex 2 FRANCE
Ph. : + 33 1 64 80 85 00 - Fax : + 33 1 64 80 85 85
Site Internet : http://www.trophy-imaging.com
E-mail : customer-service@trophy-imaging.com

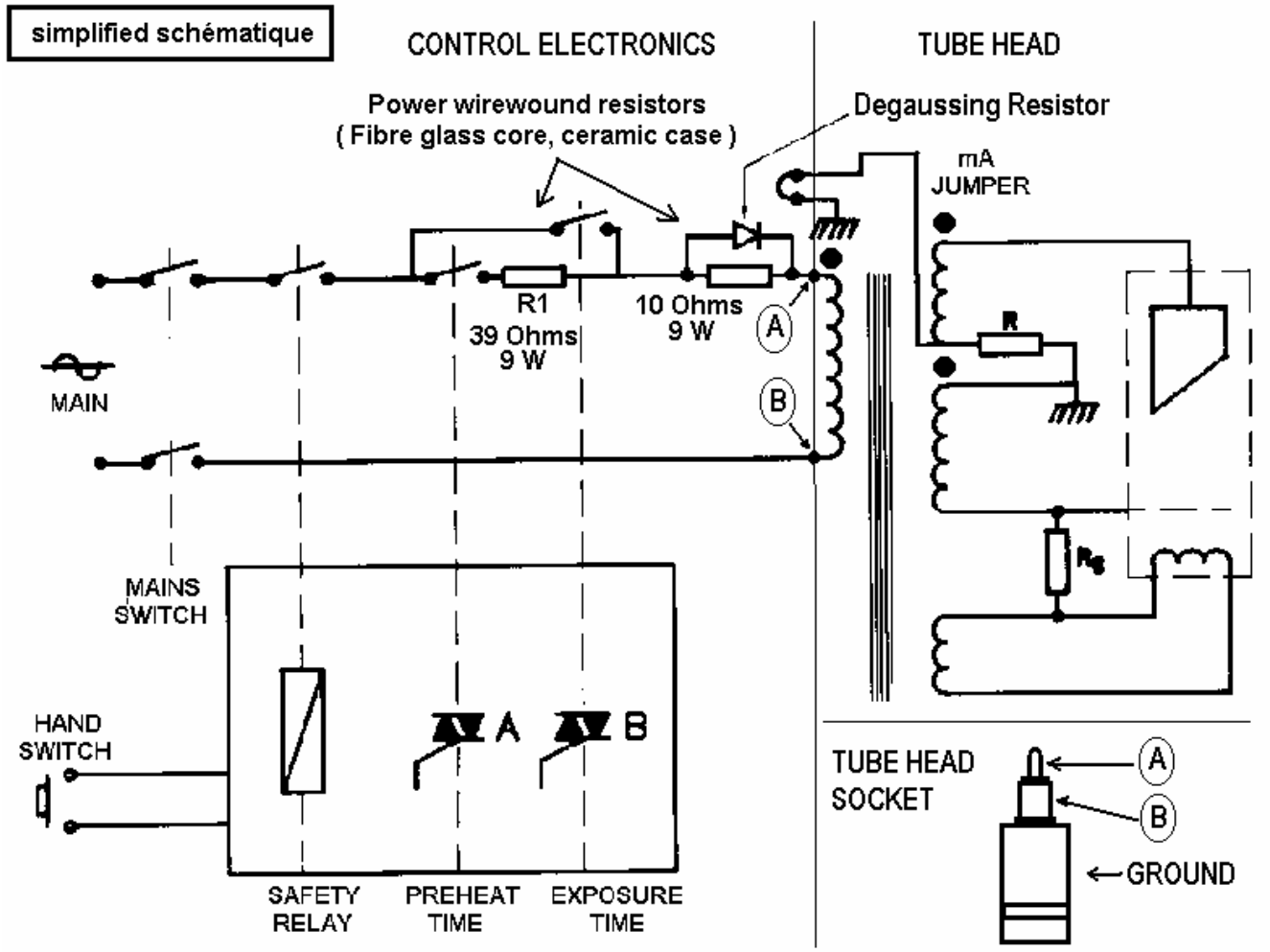
TROPHY BÉNÉLUX	30, avenue des Nymphes - Centre Cial Les Dauphins B 1410 - WATERLOO Ph. : + 32 2 354 15 28 / 68 74 - Fax : + 32 2 353 04 60
TROPHY ESPAÑA S.L.	Calle Pilar de Zaragoza, 15 28028 MADRID Ph. : + 34 91 355 88 09 - Fax : + 34 91 356 89 82
TROPHY GERMANY GmbH	Gerbereistr. 7 D 77694 KEHL-KORK RHEIN - GERMANY Ph. : + 49 78 51 93 970 - Fax : + 49 78 51 939 730
TROPHY ITALIA spa	Via Guarenti, 4 20035 - LISSONE (MI) Ph. : + 39 39 27 80 864 / 877 - Fax : + 39 39 27 80 889
TROPHY RADIOLOGY (UK) Ltd	Unit 3, Block B, Connaught, Business Centre 9, Malham Rd, Forrest Hill LONDON, S.E. 23 1AH/UK Ph. : + 44 1 81 291 99 09 - Fax : + 44 1 81 291 98 00
TREX TROPHY DENTAL DIVISION	37 Apple Ridge Road DANBURY, CT 06810 USA Ph. : + 1 203 207 - 45 45 - Fax : + 1 203 207 - 45 46
TROPHY JAPAN	TOKYO-TO MINATO-KU Toranomon 1-23-7 Toranomon 23 Mori Building JAPAN Ph. : + 81 3 35 80 68 81 - Fax : + 81 3 35 80 68 83

The IRIX 70 is a CE 0459 device

TROPHY S.A. is an ISO9001 - EN46001 company

TROPHY

IRIX 70
TUBE HEAD
X RAY GENERATOR



TROPHY TREX GROUP
4, rue F. PELLOUTIER CROISSY BEAUBOURG 77437 MARNE LA VALLEE CEDEX 2 FRANCE
TEL: +33 1 64 80 85 00 FAX: + 33 1 64 80 85 85

SIMPLIFIED OPERATION

DURING PHASE 1 : 5 < > 2Oms

When handswitch is pressed Safety Relay is activated and, power supply sent to triacs.

DURING PHASE 2 : 1 < > 20 ms

The Preheat time is going to start, by activating Triac A.

DURING PHASE 3: 220 mS PREHEAT TIME

Power supply is sent to the X-ray head through two 39 Ω resistor.

A reduced value of main supply reaches the head and high voltage to the tube is present and filament starts to warm up.

During the first 80 ms, filament is still cold, transformer is not loaded by the tube current, there is no electron going to the anode of the tube.

As the transformer is unloaded, high voltage to the tube is quite high (80-90 kV).

As the filament is warming up, some electrons are going to hit the anode with a high kinetic energy emitting a photon with a high frequency (hard X-ray). In fact the first peak detected by NERO. At that time tube current is a few µAmp (microamps).

Because of the resistive characteristics of an high voltage transformer, there is quite a big difference between high voltage loaded or unloaded. This is the first reason which makes the kV drop. This drop is increased; and increasing drop of tension through R1 while the consumption of the head is higher due to a warmer filament and a larger tube current. Filament is still warming up. Exposure time is going to start by activating TRIAC B.

DURING PHASE 4 : EXPOSURE TIME

Mains voltage is sent to the X-ray head by activating triac B (shorting R1). Filament is not hot enough to deliver the 8mA during the first 60 - 100 mS of exposure time, and this makes the kV higher than nominal value. Once the filament has reached its temperature, kV are stabilised around the nominal KV value for the complete remaining duration of exposure.

DURING PHASE 5 : 5 < > 20 ms

The two triacs A, B are opened and no voltage is applied to the tube head, no more X-rays are emitted.

Safety relay will fall down 5 < > 20 mS.

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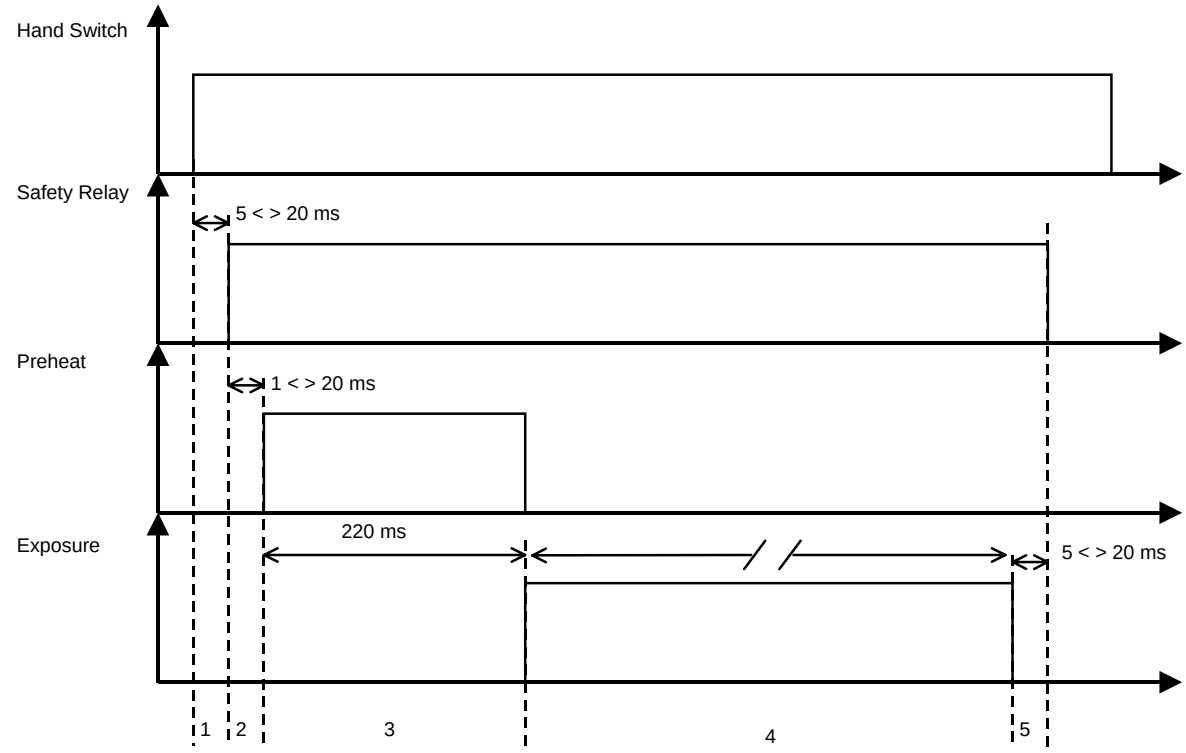
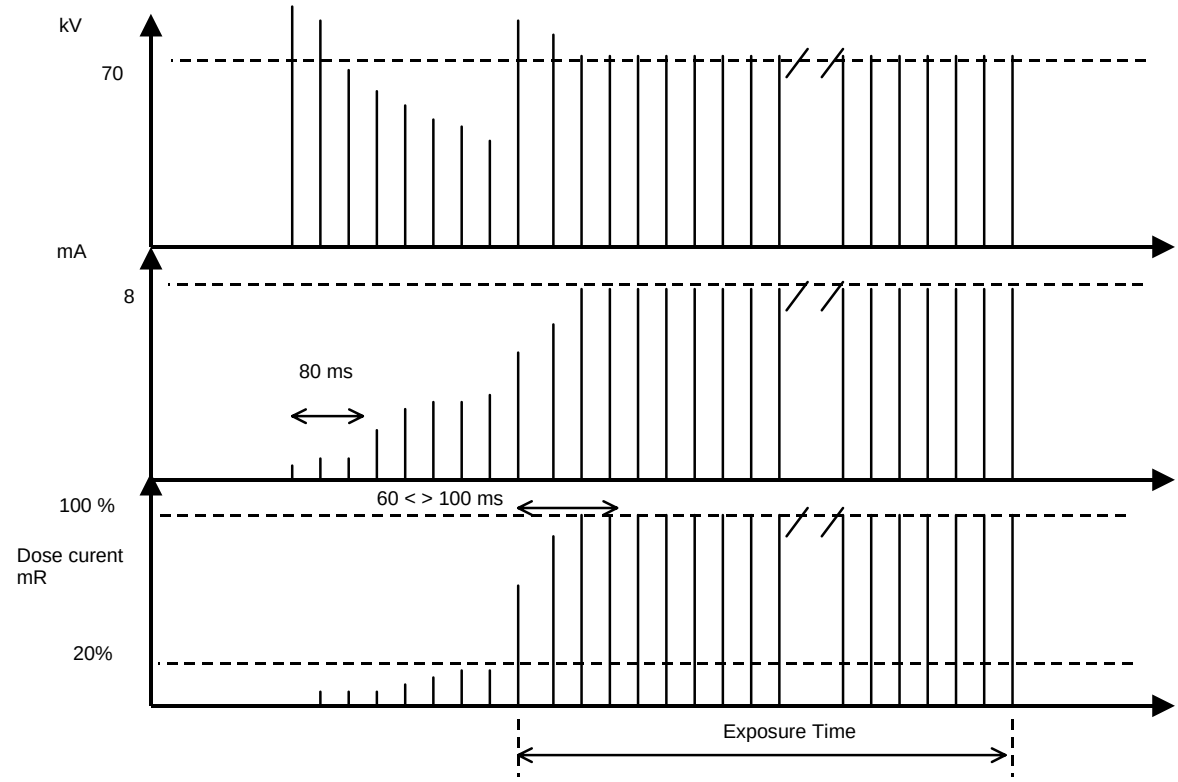
TIMING SEQUENCE DURING EXPOSURE





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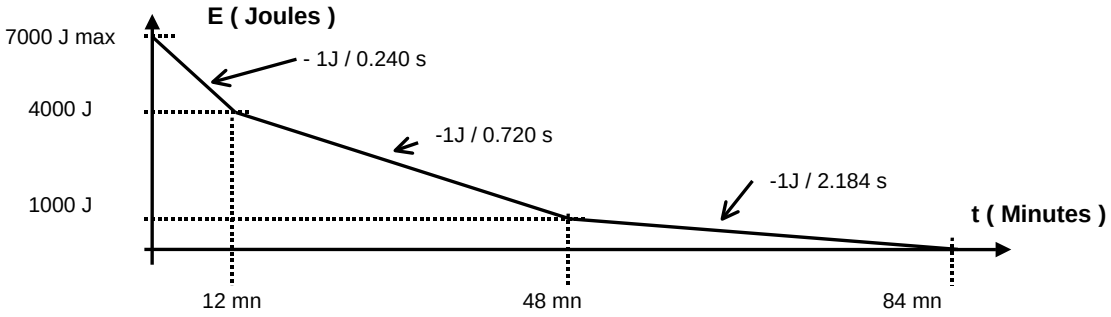
4, rue F. PELLOUTIER CROISSY BEAUBOURG 77437 MARNE LA VALLEE CEDEX 2 FRANCE
TEL: +33 1 64 80 85 00 FAX: + 33 1 64 80 85 85

TUBE HEAD CHARACRERISTICS

Main supply voltage	: 230 V 50 - 60 Hz
One peak self rectified hight votage générator	: 70 kV - 8 mA
Rated value of inherent filtration	: 1.0 mm eq. Al.
Rated value of additional filtration	: 1.5 mm eq. Al.

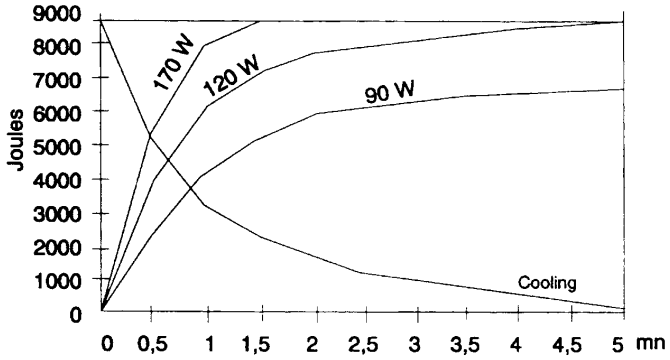
TUBE HEAD COOLING CURVES



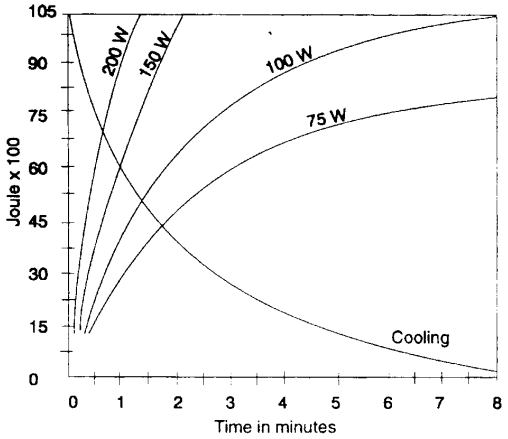
TROPHY TREX GROUP
4, rue F. PELLOUTIER CROISSY BEAUBOURG 77437 MARNE LA VALLEE CEDEX 2 FRANCE
TEL: +33 1 64 80 85 00 FAX: + 33 1 64 80 85 85

TUBE CHARACTERISTICS

Manufacturer and type of X-Ray tube	TROPHY Type TRX 708	CEI Type OCX / 65-G
Rated high voltage	70 kV	70 kV
Rated anodic power	490 W	490 W
Maximum heat accumulated in the anode	8 700 J	10 000 J
Rated value of focal spot (IEC 336/1982)	0,7 mm (.027 ")	0,7 mm (.027 ")
Reference axis for the slope of the target and indicated characteristics of the tube's focal spot	see drawing	see drawing
Target materials	Tungsten	Tungsten
Target slope	19 °	19 °
Filtration due to fixed materials	0,6 mm (.023 ") eq. Al	0,6 mm (.023 ") eq. Al



TROPHY tube type TRX 708



CEI tube type OCX / 65-G

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4, rue F. PELLOUTIER CROISSY BEAUBOURG 77437 MARNE LA VALLEE CEDEX 2 FRANCE
TEL: +33 1 64 80 85 00 FAX: + 33 1 64 80 85 85

CCX DIGITAL

DIP-SWITCH CONFIGURATION

03/05/02

Dipswitch configuration,**V3.01 software**.

SW6 :
Max exposure time.
// (open: 5sec; close:3sec)

SW7 :
+ 60 ms on exposure time display.
// (open: standard; close: +60ms)

Max mains variation.
// (open: +/-20% ; close: +/-10%)

type film selection with 2 touch.
// (open: standart; close: with 2 touch)

mains voltage.
// (open: 230 V; close: 240V)

SW8 :
Mains Voltage.
// (open: other; close: 110V ou 130V)

SW11 :
RVG mode
// (open:RVG enabled; close:RVG inhibited)

SW12 :
Bitube mode.
// (open: 1 tube (n1); close: 2 tubes (n1&2))

SW13 :
Number of film type.
// (open: 0 to 9; close: 0 to 6)

SW15 :
genrator consumption monitoring
// (open: monitoring; close: no monitoring)

SW16 :
control exposure time to compensate for mains variation
// (open: compensation; close: no compensation)

SW1 to SW5 and SW14:
Always open.

Dipswitch configuration,**V3.02 at V3.05 software**.

SW1 :
+ 60 ms on exposure time display.
// (open: standard; close: +60ms)

SW6 :
Max exposure time.
// (open: 5sec; close:3sec)

SW7 :

Max mains variation.
// (open: +/-20% ; close: +/-10%)

type film selection with 2 touch.
// (open: standart; close: with 2 touch)

mains voltage.
// (open: 230 V; close: 240V)

SW8 :
Mains Voltage.
// (open: other; close: 110V ou 130V)

SW11 :
RVG mode
// (open:RVG enabled; close:RVG inhibited)

SW12 :
Bitube mode.
// (open: 1 tube (n1); close: 2 tubes (n1&2))

SW13 :
Number of film type.
// (open: 0 to 9; close: 0 to 6)

SW15 :
genrator consumption monitoring
// (open: monitoring; close: no monitoring)

SW16 :
control exposure time to compensate for mains variation
// (open: compensation; close: no compensation)

SW2 to SW5 and SW14:
Always open.

back

TROPHY
4, rue F. PELLOUTIER - CROISSY BEAUBOURG - 77437 MARNE LA VALLÉE CEDEX 2 - France
TEL: +33 1 64 80 85 00 FAX: +33 1 64 80 85 85

GB

trophy

INTRA-ORAL X-RAY UNIT

IRIX 70

INSTALLATION AND MAINTENANCE MANUAL

Trophy constantly strives to improve its products and, therefore, reserves the right to deliver, without prior notice, machines whose characteristics differ from those described here; nonetheless, these machines are still guaranteed to comply with regulations in force. All rights reserved.

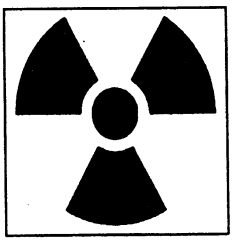
CAUTION ! ...
PROTECTION AGAINST X-RAYS

X-rays are not innocuous and can be dangerous if used badly. You must, therefore, take precautions even when following the instructions in this manual.

X-ray units manufactured by TROPHY comply with the strictest safety standards in force throughout the world (Europe, USA, Japan). They guarantee optimum protection against radiation risks.

Nonetheless, you are handling a unit specifically designed to generate X-rays to allow medical diagnosis on a film or using RVG (a dental digital imaging system). Consequently, despite the inherent safety of our equipment, we recommend using conventional commercially-available equipment to protect yourself and your patient against scattered radiation risks.

During installation, it is necessary to emit X-rays to check the operation of the X-ray unit. Any operation which involves the X-ray emission is preceeded by this sign, to remind you to apply all the normal precautions required in your country.



In the same spirit, the room which houses your X-ray unit must comply with all official regulations applicable to protection against radiation.

It is mandatory to use this X-ray unit with its beam limiting device.

Your dental dealer will be pleased to help you with the initial use of your unit and to answer any subsequent questions you may have.

NOTE TO THE USER

You have just purchased a TROPHY intra-oral X-ray unit IRIX 70. We congratulate you on your choice, and are sure you will be fully satisfied with its use and diagnostic capabilities.

TROPHY X-ray units offer high quality and advanced technology.

We recommend reading this manual carefully before using your unit, to become familiar with its operation and make the most of its performance.

Keep this manual in a safe place so that you can easily refer to it in the future.

Thank you for placing your confidence in TROPHY.

NOTE TO THE INSTALLER

The installer must:

- follow the installation procedure described in this manual when installing the TROPHY X-ray unit.
- provide all explanations required on use of the TROPHY X-ray unit, following the instructions given in the user's manual.
- return a correctly completed guarantee slip to TROPHY so that the TROPHY 2-year guarantee on the complete unit and 10-year pro rata-temporis guarantee on the generator are valid; otherwise the guarantee will start at the date of manufacture.

WARRANTY CONDITIONS

It is the responsibility of the user to comply with current legislation concerning installation and operation of the equipment.

In the event of incorrect use or defective maintenance not complying with the recommended scheme, TROPHY or its representative shall not be liable for any deficiencies, physical damage, personal injuries or non conformity that may occur as a result.

The equipment must not be used if electrical, mechanical or radiation protection components are defective, or if the operations stipulated by the maintenance program have not been carried out.

Only TROPHY or third parties duly authorized by TROPHY may carry out modifications or add extensions to the installation and equipment.

Such modifications shall always be carried out in compliance with the regulations in force in the country of operation, and in compliance with normal trade practice.

If the power supply characteristics do not comply with the recommendations given in the Installation and Maintenance Manual section 4 Chapter II "Prior to Installation", the IRIX 70 unit will not be able to provide maximum performance, and it will not be possible to guarantee normal operation.

You can obtain a complete technical file about the IRIX 70 unit by simply requesting it from TROPHY.

TRANSPORTATION CONDITIONS

The goods are transported at the consignee's risk.
Any disputes as to losses or damage occurring during transportation must be stated in the presence of the haulier upon delivery, and must be noted on the delivery slip.

Under no circumstances shall packaging materials manufactured by TROPHY be used for any other purposes than transportation.

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Original language of document: FRENCH

I. GENERAL CHARACTERISTICS

IMPORTANT NOTE

The instructions given in this manual apply to a wall-mounted TROPHY X-ray unit.
If the unit is to be mounted on a mobile stand, on the floor, on unit or from the ceiling, refer to the supplements included in the packing.

1. TECHNICAL CHARACTERISTICS ACCORDING TO IEC STANDARD 601-2-7

Manufacturer

TROPHY
4, rue F. Pelloutier - Croissy-Beaubourg
77437 MARNE-LA-VALLÉE CEDEX2 - FRANCE

Models

Dental X-ray diagnosis devices, class 1, type B, intermittent use with protection against radiation risks according to IEC standard 601-1-3 (1994).

IRIX 70

Electric power supply

Power absorbed 900 VA

230 - 240 V AC (± 10%), 50 Hz, 4 A, apparent resistance 0,5 Ω
Permanent current 0.05 A
Current during X-ray emission 4 A

110 - 130 V AC (± 10%), 50/60 Hz, 8 A, apparent resistance 0,2 Ω
Permanent current 0.1 A
Current during X-ray emission 8 A

Rated high voltage and maximum corresponding current 70 kV/8 mA

Current/voltage combinations for a maximum output power of 414 W

- with a form factor of .74 70 kV/8 mA

Rated power for exposure time of 0.1 s with 70 kV/8 mA 414 W

Reference time/voltage product

kV	mA	s	mAs
± 10%	± 15%	± 10%	
70	8	0,1	0,8

Rate of use

At 70 kV, 8 mA and 0.1 s and at the maximum tank temperature: one exposure every 13 seconds.

Minimum value of the current/time product in the range of conformity: 0.48 mAs at 8mA

Applicable range of load parameters

Due to the mains frequency and for exposure times lower than 0.063 s, some values of the R'10 series do not exist. Mains variation compensation for these values is not correct.

Area of conformity to the IEC standard 601-2-7

- Reproducibility of the emitted radiation conform
- Linearity of the emitted radiation conform
- Precision in radiography conform

Measurement conditions

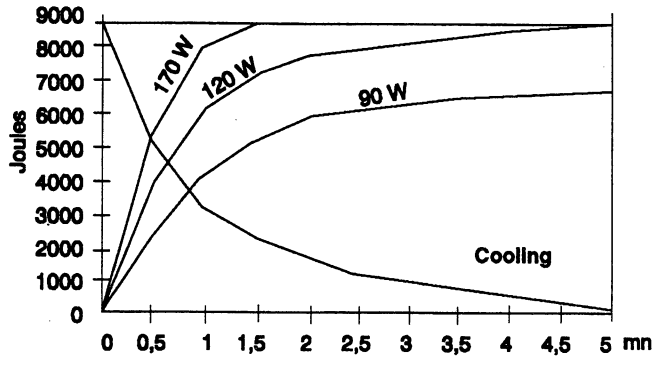
- kV: direct measurement using a peak kilovoltmeter
- mAs:direct measurement in the circuit using a mAsmeter
- Exposure time:measurement of the number of peak higher than 20% of the maximum dose current using a dosemeter

Dimensions and weight

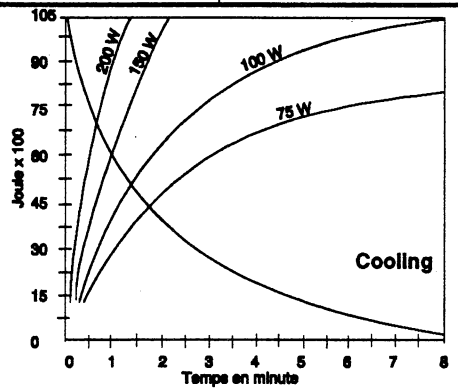
Timer unit	4-5/16 x 5-13/16 x 11-5/8 in. 110 x 145 x 295 mm	5.95 lb 2.7 kg
X-ray emitting unit	5-1/2 x 7-7/8 x 15-9/16 in. 140 x 200 x 395 mm	17.63 lb 8 kg
Scissor arm	2-3/8 x 5-5/8 x 34 in.) 60 x 135 x 865 mm	26.445 lb 12 kg

2. MAIN CHARACTERISTICS OF THE X-RAY GENERATOR according to EN 60601-2-28 standard

Manufacturer and type of X-ray tube	TROPHY Type TRX 708	CEI Type OCX / 65-G
Rated high voltage	70 kV	70 kV
Rated anodic power	490 W	490 W
Maximum heat accumulated in the anode	8 700 J	10 000 J
Rated value of focal spot (IEC 336/1982)	0.7 mm (.027 ")	0.7 mm (.027 ")
Target materials	Tungsten	Tungsten
Target slope	19 °	19 °
Filtration due to fixed materials	0.6 mm (.023 ") eq. Al	0.6 mm (.023 ") eq. Al



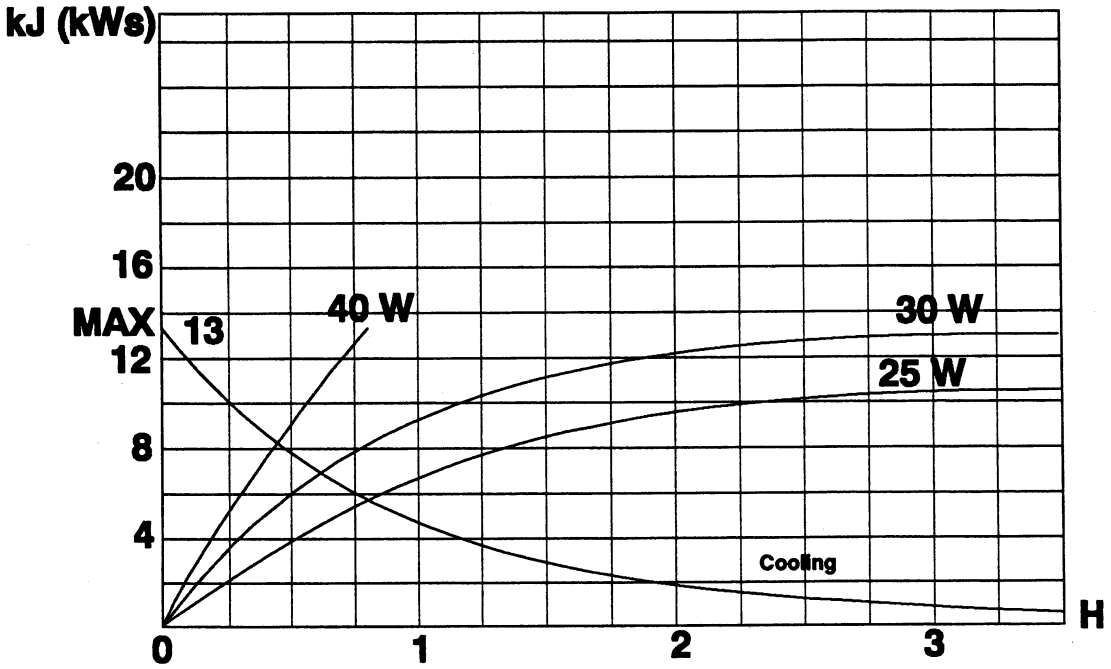
TROPHY tube type TRX 708



CEI tube type OCX / 65-G

Equipped X-ray generator

IEC standard 601-2-28	conform
Type of protection against electric shocks	Class I
Degree of protection against electric shocks	Type B
Rated value of inherent filtration at 70 kV	1.0 mm (.059 ") eq. Al
Rated value of additional filtration at 70 kV	1.5 mm (.039 ") eq. Al
Rated value of total filtration at 70 kV	2.5 mm (.098 ") eq. Al
Beam limiting cone, focal spot/skin distance	20 cm (7-7/8 in.)
Maximum accumulated heat	13,000 J
Maximum continuous thermal dissipation	30 W
Leaking radiation for a maximum rate of use at 414 W for one hour	< 0.25 mGy
Maximum field of symmetrical radiation	2-3/8 in. (6 cm) diameter
Safety thermal switch temperature	66 °C

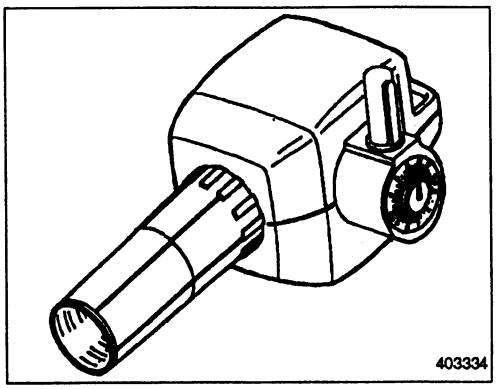


Heating and cooling curves of the X-ray tank

3. GENERATOR

The generator includes:

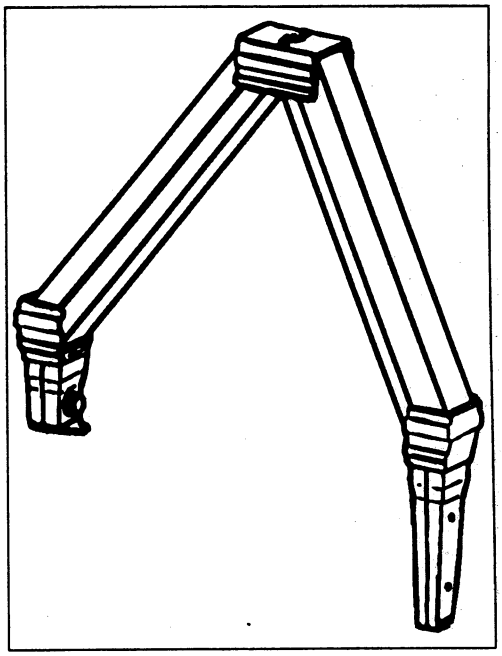
- an oil-bath transformer and an X-ray tube with grid to limit secondary radiation
- an aluminum filter to improve the beam quality and reduce the dose received by the patient
- a cone which restricts the radiation to a 6 cm diameter at the patient's skin and maintains a distance of 20 cm between the X-ray focal point and the skin.



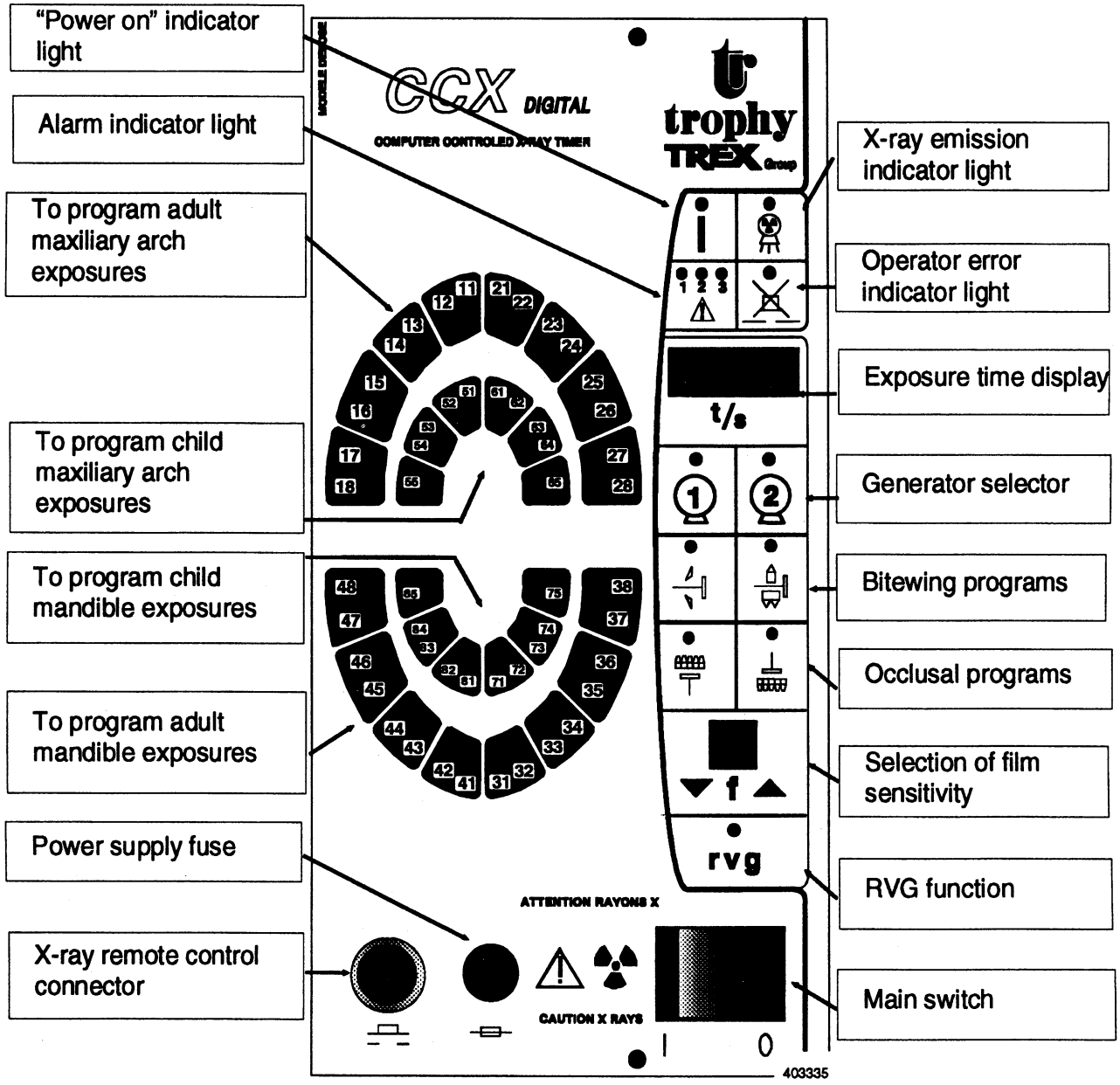
4. SCISSOR ARM

The scissor arm consists of two compensated-spring arms which allow easy, accurate positioning of the generator.

A three-core cable runs through the arm, connecting the generator to the timer.



5. CCX DIGITAL TIMER



The main characteristics of the timer are:

- anatomic selection and digital display of the exposure time
- automatic compensation for variation in mains voltage (± 20%)
- automatic built-in test of the microprocessor each time the unit is switched on
- an alarm triggered in the event of an incorrect manipulation
- an "RVG" button which automatically adjusts the exposure time if a RVG (RadioVisioGraphy) is used
- an internal diagnostic function
- a temperature safety

Once a tooth and a type of film have been selected on the timer, its microprocessor automatically calculates the optimum exposure time, based on the density of the zone to be examined.

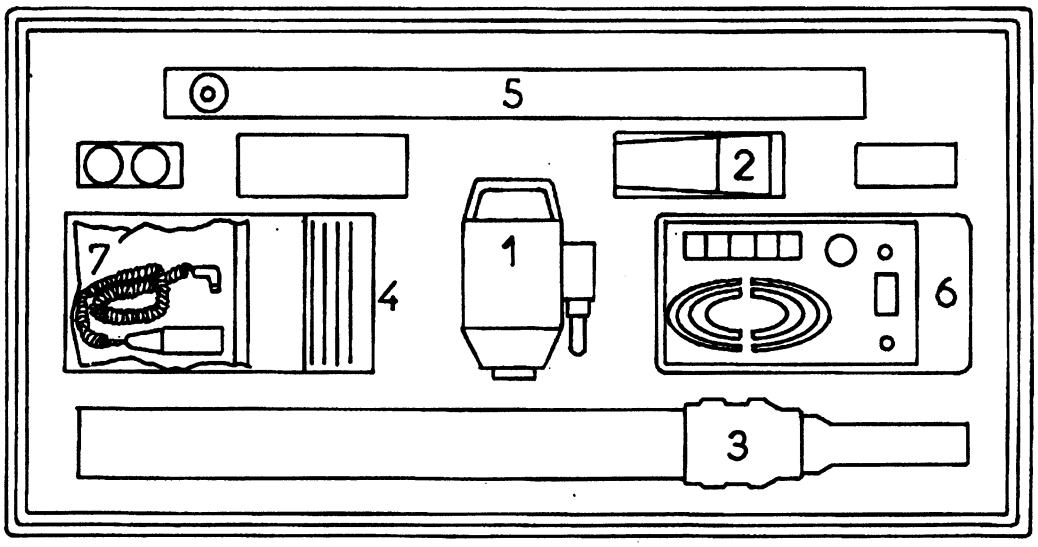
The timer includes a "dead man" safety system which stops X-ray emission as soon as the handswitch button is released.

X-rays are emitted as soon as the handswitch button is pressed; emission is indicated by a yellow light and an audible signal.

Emission stops as soon as the handswitch button is released or once the exposure time determined by the timer has elapsed; the yellow indicator light then goes out and the audible signal stops.

II. BEFORE INSTALLATION

1. PACKING



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Box dimensions (L x W x H): 38" x 20" x 11" (980 mm x 500 mm x 290 mm)

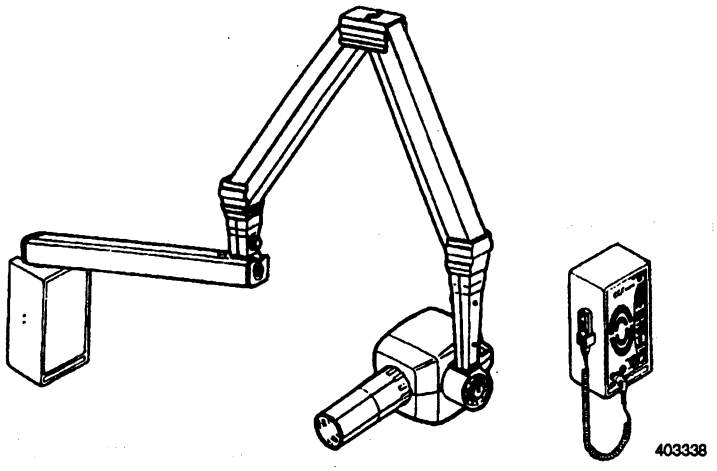
The TROPHY X-ray unit comprises the following components arranged in special expanded polystyrene packing to guarantee complete protection during transport, as shown on the above diagram.

No.	DESCRIPTION
1	Generator
2	Cone
3	Scissor arm with generator cable
4	Plastic bags containing: - scissor arm plastic covers - extension arm plastic covers - the scissor arm brake kit
5	Scissor arm extension arm length: 12", 24" or 32" (30, 60 or 80 cm) as specified with the order
6	Wall bracket and CCX digital timer in its housing
7	CCX digital timer handswitch
in the polystyrene cover	Scissor arm tension adjustment tool

2. OPTION: INSTALLATION OF THE TIMER IN A SEPARATE BOX OR DUALTUBE OPTION

All installation configurations, with the exception of the model for a mobile stand, can include the "timer in separate box" option which allows the timer to be mounted separate from the arm/generator assembly.

In this case, the X-ray unit wall bracket is accompanied by a cover.



The CCX digital timer is delivered complete with its housing and a plastic wall-mounted back for the housing which allows the timer to be mounted on a wall, separate from the X-ray unit. It is then possible to control exposure remotely but still visually check the parameters selected.

3. TOOLS REQUIRED FOR INSTALLATION (not supplied)

- an analog multimeter
- a tape meter
- a 0.51" (13 mm) open-end wrench
- a 0.22" (5.5 mm) screwdriver wrench
- a set of Allen keys
- a spirit level
- a plastic mallet
- a percussion drill with a set of drills from 3 to 13 mm (.12 to .51 in.)
- a fine electrician's screwdriver
- a medium-sized screwdriver
- The mains line must be made of a three-core (phase + neutral + earth) electric cable. Recommended core cross-section: 1.5 mm^2 (14AWG) and the wire colours and characteristics correspond to each country's electricity regulation.The maximum length are 8 meters (8.75 yd.) in 100/130 V and 16 m (17.5 yd.) in 230/240 V. For longer runs, use heavier-gauge cable complying with standards in force in the country.

Attachment of the wall bracket:

- Use mounting accessories suitable to the type of wall (see "Mechanical requirements", page 10, § 4).

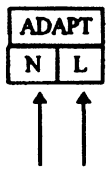
With the "timer in separate box" option or dualtube option:

- Use mounting accessories suitable to the type of wall.
- Use the necessary length of cables to connect the timer to the wall bracket 3-core (phase + neutral + earth) cable cross-section 1.5 mm^2 (14 AWG) and an additionnal earth cable cross-section 2.5 mm^2 (12 AWG). The length must not exceed 8.75 yd (8 meters). For longer runs, use heavier-gauge cable complying with the standards in force in the country.

4. WARNING LIGHTS

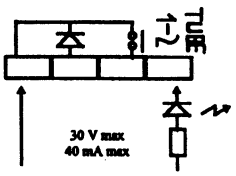
The ready status enabling X-ray emission (preparation time) can be indicated in places far from the X-ray unit.

To do that, connect a light with the corresponding voltage, 40 W maximum, between terminals N and L of connector J4 of the CJ251 PCB.



For the dualtube option, it is possible to indicate in place far from the X-ray unit which tube is in use.

To do that, connect a LED between the relevant terminal of connector J3 of CJ251 PCB.



5. MECHANICAL REQUIREMENTS

☞ ***CAUTION:****The TROPHY X-ray unit must be installed such that it is impossible to rotate the scissor arm through 360°.*
Otherwise, the power supply cable can fail and cause electrical damage.

The wall bracket which carries the X-ray unit must be strongly attached to the wall. Choose an attachment system suitable for the type of wall and capable of withstanding a tear-off force of 330 lbs (150 kg) per anchor point.

For an extension arm of 39-1/8 in. (100 cm) the tear-off force is 375 lbs (170 kg) per anchor point.

Check that the wall is plumb to avoid any drift in the arm position. Use spacers if the wall surface is far from plumb.

☞ ***If the wall cannot withstand these tear-off forces, a stiffening plate is available from TROPHY, code number: HN436***

6. ELECTRICAL REQUIREMENTS

The unit must be fed by a special electrical line originating at the meter and protected by a 10A circuit-breaker (curve D) and a differential of 30 mA..

The mains line must be made of a three-core (phase + neutral + earth) electric cable. Recommended core cross-section: 1.5 mm^2 (14AWG) and the wire colours and characteristics correspond to each country's electricity regulation.

The maximum length is 8 meters (8.75 yd.) in 100/130 V or 16 m (17.5 yd.) in 230/240 V. For longer runs, use heavier-gauge cable complying with standards in force in the country, e;g; 3 mm2 (12 AWG) for a length of 32 m (35 yd.) in 240 V.

The line's apparent resistance must be less than or equal to 0,2 Ω for 110/130 V and 0,5 Ω for 230/240 V.

The X-ray unit must be permanently connected to the mains supply. A plug/socket connection is only acceptable for mobile units.

The X-ray unit must have a fixed connection to the mains.

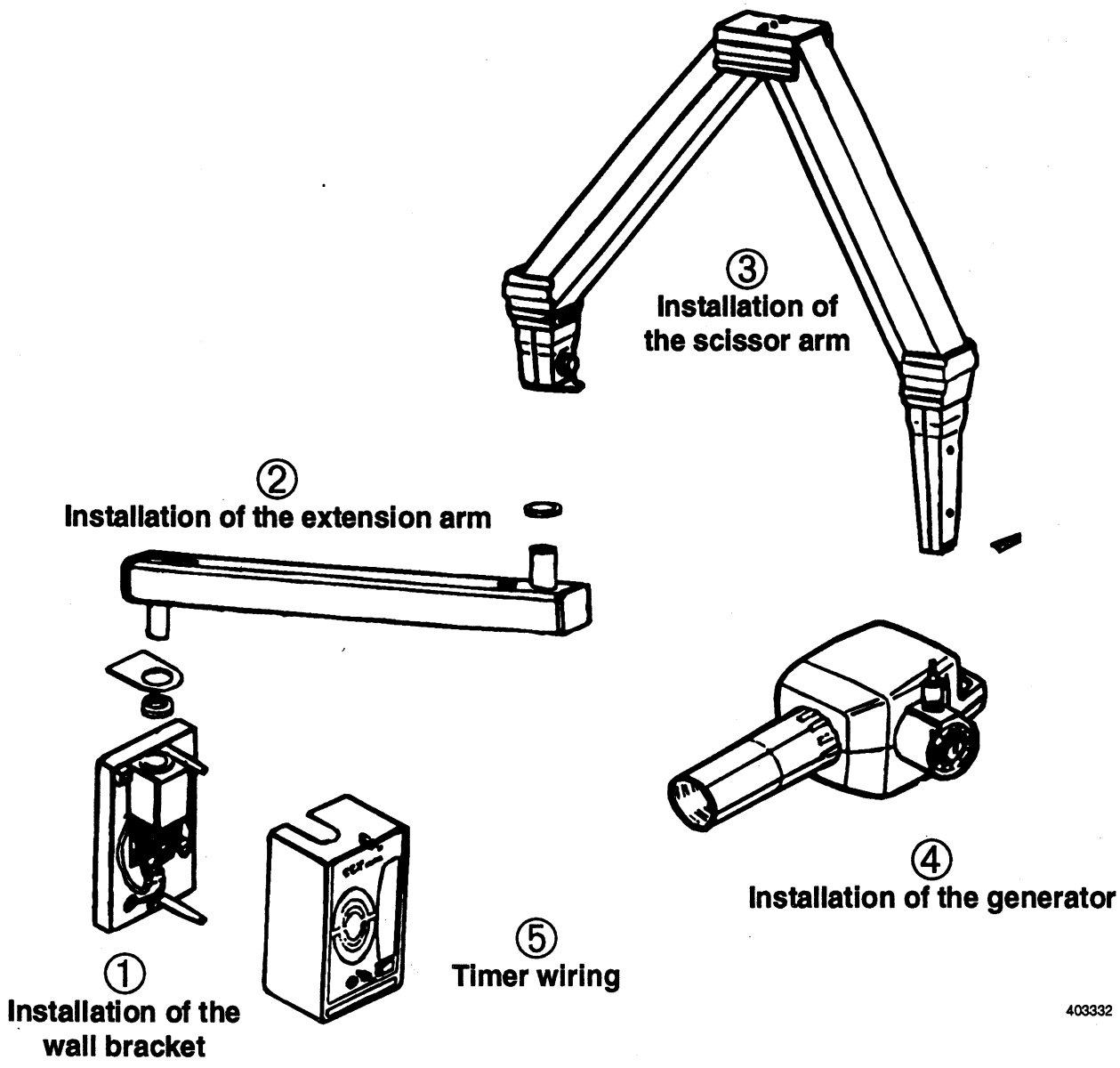
Nominal voltage (off-load)	Minimum	Maximum	Max line current
110 V	90 V	130 V	10 A
130 V	104 V	156 V	10 A
220 V	184 V	276 V	6.3 A
240 V	216 V	264 V	6.3 A

IMPORTANT

The maximum line current is obtained when the power supply cable between the generator and the timer is correctly connected (see § 2 pages 23 and followings).
Max line voltage variation: 3% on load.

☞ ***CAUTION:*** *If other equipment is connected to the same line, interference and voltage variations may cause incorrect operation of your X-ray unit.*

III. INSTALLATION



TROPHY X-ray units must only be installed by a qualified technician and then only in compliance with the mechanical and electrical installation instructions given below.

Regardless of the type of installation, the timer must always be installed so that the patient and the parameters are clearly visible from the control position.

☞ ***CAUTION:*** *Before going any further, check that the voltage indicated on the generator label is the correct value for your mains system.*

1. MECHANICAL INSTALLATION OF THE X-RAY UNIT

1.1. WALL BRACKET

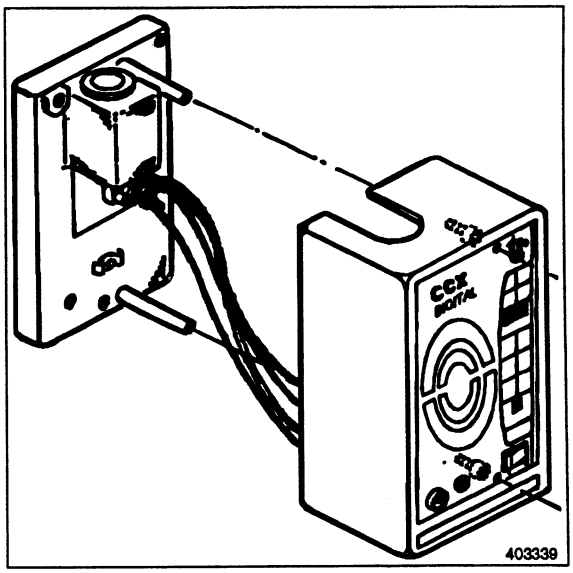
- Unpack the timer.

  Use a 3 mm Allen key to remove the two socket-head screws which hold the timer and its housing on the wall bracket.

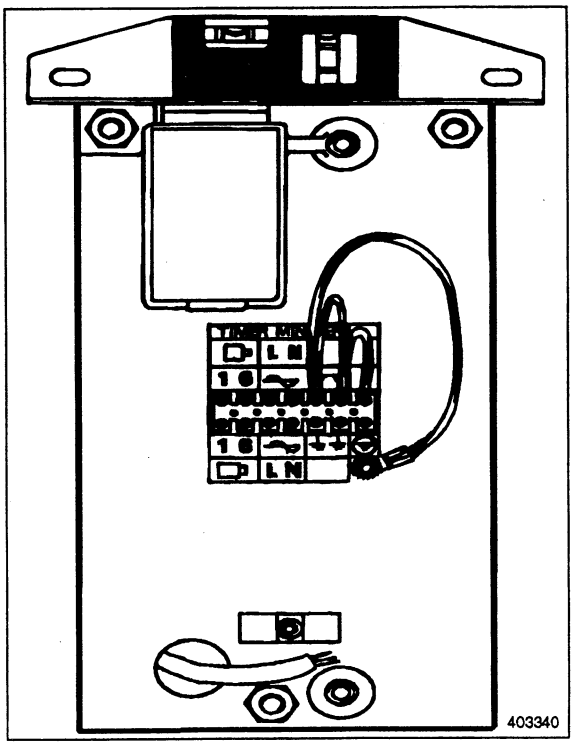
  At the wall bracket end:
  - disconnect the timer earth wire
  - disconnect the 4 timer wires from the wall bracket terminal strip.

  The timer remains in its housing.

  If the "timer with separate box" option is used, remove the cover.



- Place the wall bracket in the required position and check it is horizontal with a spirit level. Mark the three points at which it is attached to the wall. It is recommended to position the top of the bracket approx 47" (1.20 m) above floor level.
- Drill the holes in the wall and insert the mounting accessories to suit the type of wall.
- Thread the power supply cable through the hole in the wall bracket and mount the wall bracket. If the wall is not perfectly plumb, use correcting spacers.
- Check that the wall bracket is plumb and horizontal and then firmly tighten the screws.



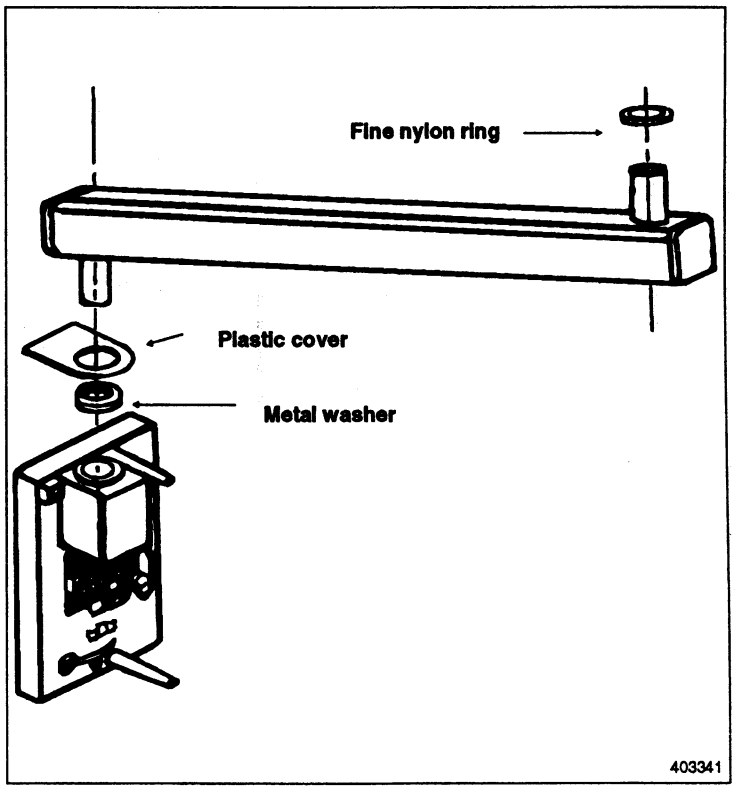
1.2. EXTENSION ARM

- Check that the extension arm pivots include:
  - a metal washer at the wall bracket end
  - a fine nylon ring at the scissor arm end.

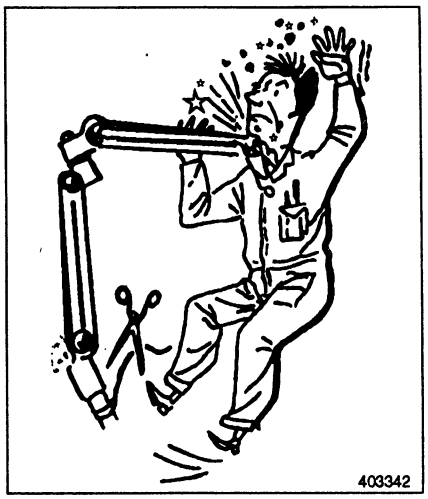
☞ ***CAUTION:*** *It is **essential** to mount the extension arm this way round, i.e. with the metal washer on the wall bracket and the nylon ring at the scissor arm end, or the assembly will be unbalanced.*

- DO NOT GREASE PIVOTS: the scissor arm and wall bracket include self-lubricating bushes.
- Check that the metal washer is in position.

- Place the timer housing plastic cover on the extension arm pivot.
- Insert the extension arm pivot in the top hole on the wall bracket.
- Using a spirit level, check that the arm slopes slightly upwards (approx 1°).
  If not, the arm has been installed the wrong way round: install it correctly.

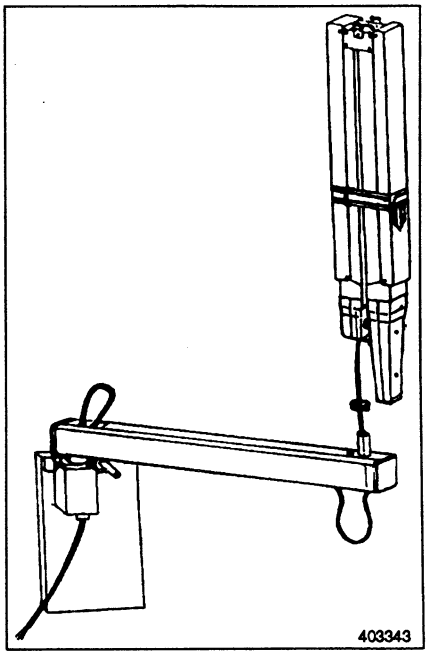


1.3. SCISSOR ARM



☞ ***CAUTION:*** *Do not loosen the scissor arm retaining strap until the generator is in position and fixed.*
Otherwise, the arm may extend suddenly, possibly causing damage or injury.
The scissor arm is not designed to be used without the generator.

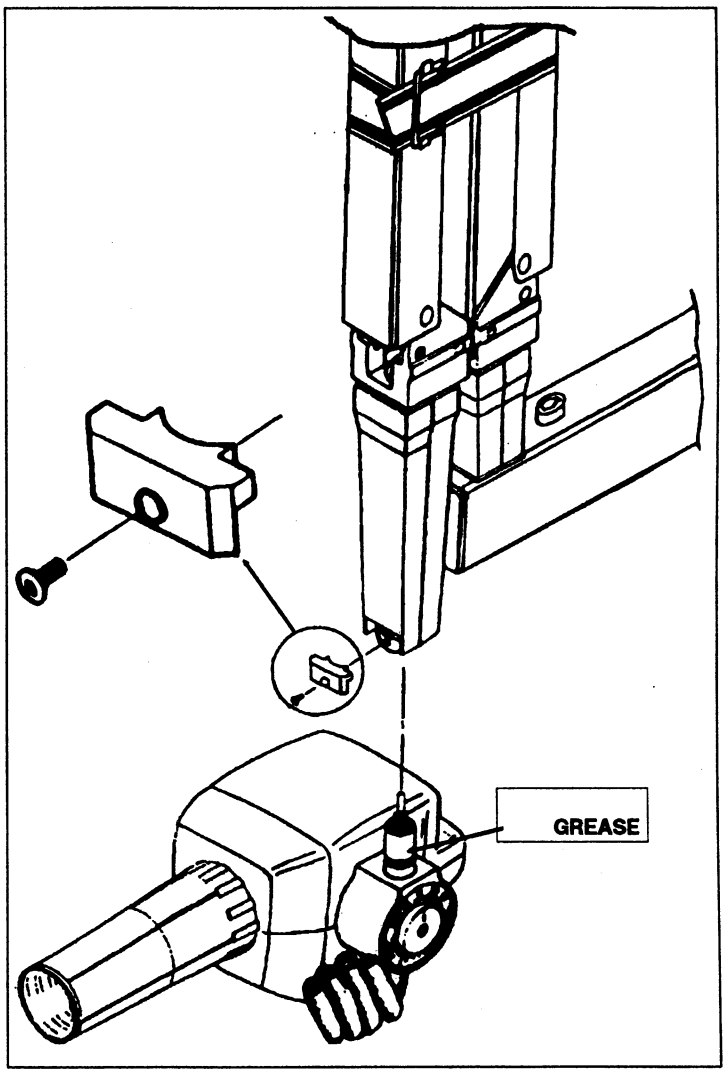
- DO NOT GREASE the extension arm pivot: the bush in the scissor arm is self-lubricating.



- Check that the nylon bush is in position and then insert the generator cable from the scissor arm pivot into the extension arm pivot, ensuring it exits below the extension arm.
- Install the scissor arm on the extension arm, sliding in the electric cable.
- Next feed the cable into the extension arm via the opening under the arm, so that it exits at the wall end via the opening at the top of the extension arm. If the cable jams in the sheath inside the extension arm, move it back and forth, turning it slightly, until it passes correctly.
- Slide the cable into the wall bracket via the extension arm pivot.

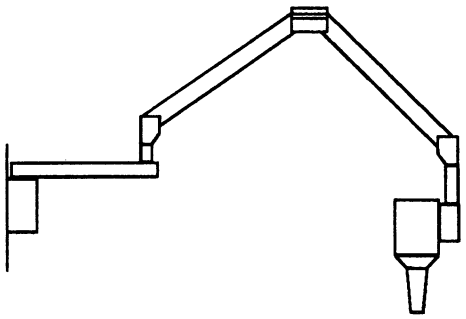
1.4. GENERATOR

- Remove the black plastic locking collar from the end of the scissor arm using a 0.08" (2 mm) Allen key.
- Place the generator firmly in position, from beneath the arm, with the plug pointing upwards.
- Check for grease on the pivot.
- Insert the plug into the socket in the scissor arm and push firmly upwards until the plastic parts of the scissor arm and generator are in contact.
- Hold the generator in this position and insert the locking collar in its slot. Fit and firmly tighten the attachment screw using a 0.08" (2 mm) Allen key.
- Screw the cone onto the generator.
- Remove the arm retaining strap.



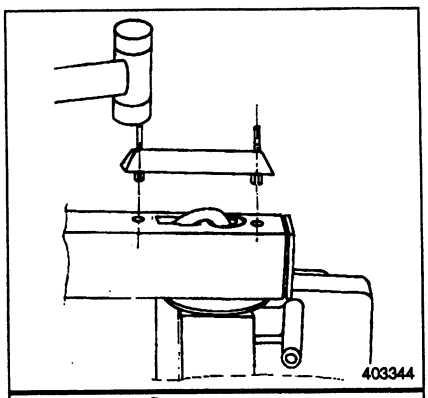
1.5.EXTENSION ARM'S HORIZONTALITY

- Set the scissor arm in the position shown aside.
- the arm, half extended, must remain in the same position during its horizontal rotation movement
- In the same starting position, using a spirit level placed on the extension arm, check the arm's horizontality during its horizontal rotation.

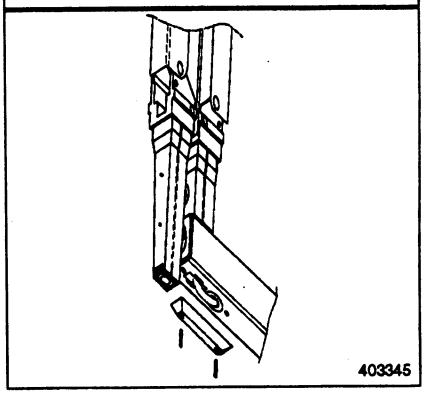


1.6.EXTENSION ARM END OF MOUNTING

- Fit the two plastic covers, which conceal the cable, to the extension arm.
  To do this, position the cover in line with its housing and drive the two plastic pins into the holes provided using a plastic mallet.
  This locks the cover in position.



- Do the same at the scissor arm end.

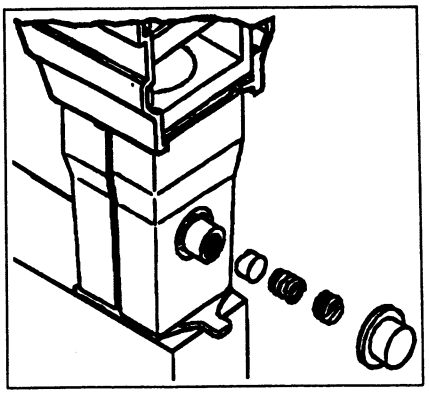


1.7. BRAKE

- Install the scissor arm brake kit; this prevents the arm moving under its own weight if the wall is not perfectly plumb.

  Always ensure brake components are mounted the right way round, or the system will not be fully effective.

  Initially, tighten the screw only moderately.



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1.8. OPTION: TIMER WITH A SEPARATE BOX OR DUAL TUBE

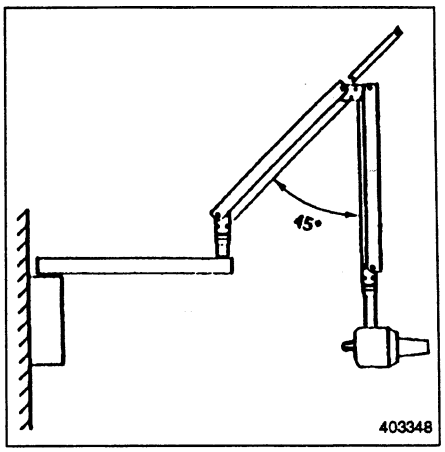
(Separate timer for remote control)

- A three-core cable is required to connect the X-ray unit to the timer.
  3-core (phase + neutral + earth) cable cross-section 1.5 mm^2 (14 AWG) and an additionnal earth cable cross-section 2.5 mm^2 (12 AWG).
  The length must not exceed 8.75 yd (8 meters). For longer runs, use heavier-gauge cable complying with the standards in force in the country.
- In addition to the above assembly operations, the timer must be installed:
  - Unpack the timer.
  - Using an Allen key, remove the two socket-head screws which attach the timer to the plastic housing back and disconnect it. The timer remains attached to its housing.
  - Drill the three holes in the wall, at the required height, pass the timer power supply cable and the cable from the X-ray unit through the hole provided and then install the housing back on the wall.

1.9. MECHANICAL ADJUSTMENT - SCISSOR ARM BALANCE

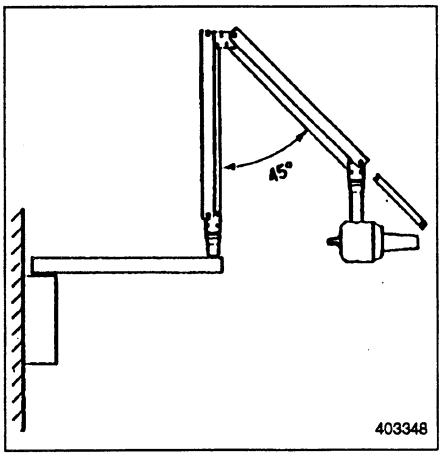
If the scissor arm is not stable in its position, carry out one of the following adjustments:

1.9.1. Adjustment at the wall-end of the arm



- Set the arm at 45° (see figure opposite).
- Using the special tool supplied, adjust the scissor arm spring tension.
  Increase the tension (turn clockwise) if the arm tends to drop.
  Reduce the tension (turn anti-clockwise) if it tends to rise.

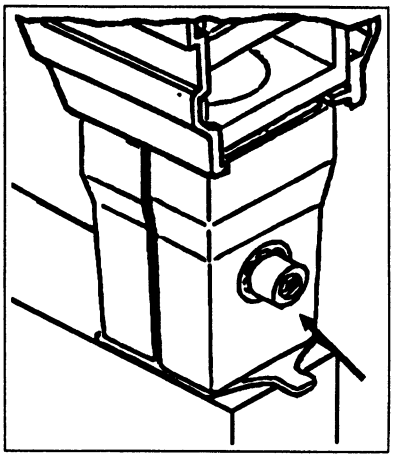
1.9.2. Adjustment of the generator-end



- Set the arm at 45° (see figure opposite)
- Using the special tool supplied, adjust the scissor arm spring tension.
  Increase the tension (turn clockwise) if the arm tends to drop.
  Reduce the tension (turn anti-clockwise) if it tends to rise.

1.9.3. Adjustment of arm horizontal motion

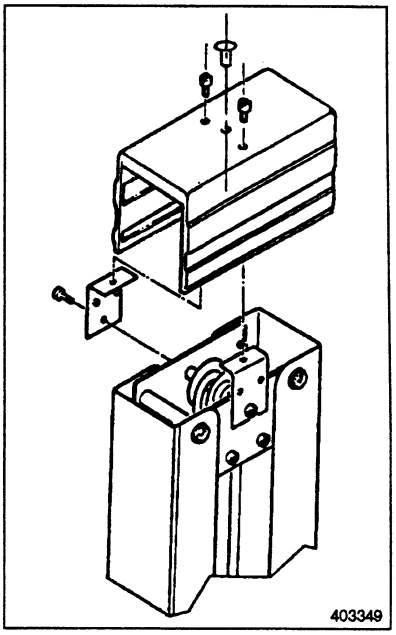
- Remove the brake cover.



- Adjust the brake so that the arm does not move horizontally under its own weight regardless of its position, but can still be freely moved by hand.
  Tighten the brake (turn clockwise) to prevent drift.
  Slacken it to allow easier movement.
  Refit the cover.

1.10. FINAL STEPS

- Fit the 2 brackets on either side of the scissor arm hinge (1 screw).
- Fit the central plastic cover to the 2 brackets as shown opposite (2 screws).

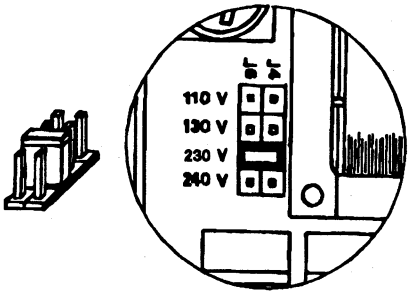


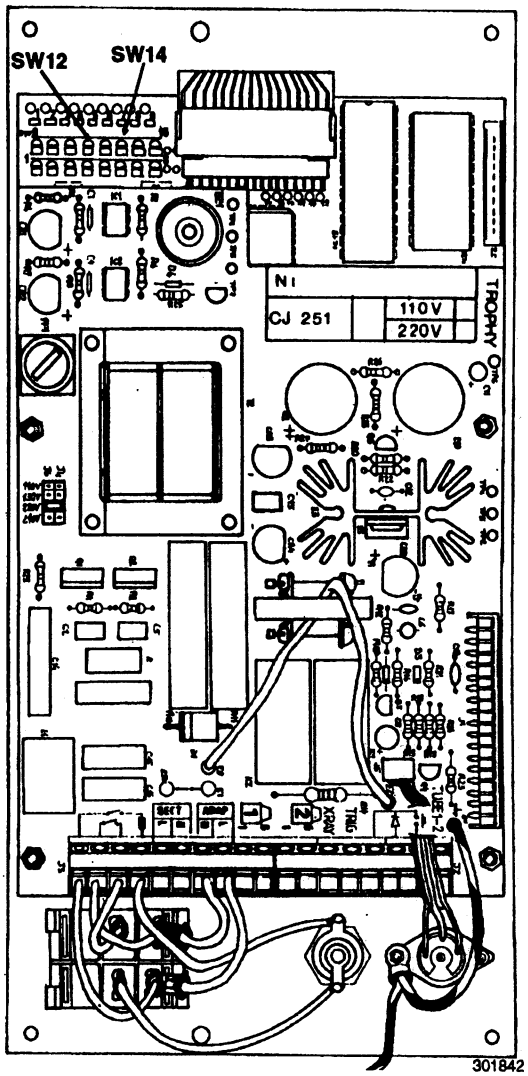
2. ELECTRICAL INSTALLATION

2.1. CCX DIGITAL TIMER CONFIGURATION

- Place the voltage selector jumper on the power board opposite the value of your mains power supply:

Jumper on	Minimum	Maximum
110 V	90 V	133 V
130 V	104 V	156 V
230 V	184 V	276 V
240 V	216 V	264 V





☞ ***By defaul (factory setting), generator n° 2 is always inhibited in CCX digital timers. If you need to connect 2 generators to the same timer, solder jumper SW12 in position.***

Refer to the complete description of all jumpers given in the table in the appendices dip sw desc.

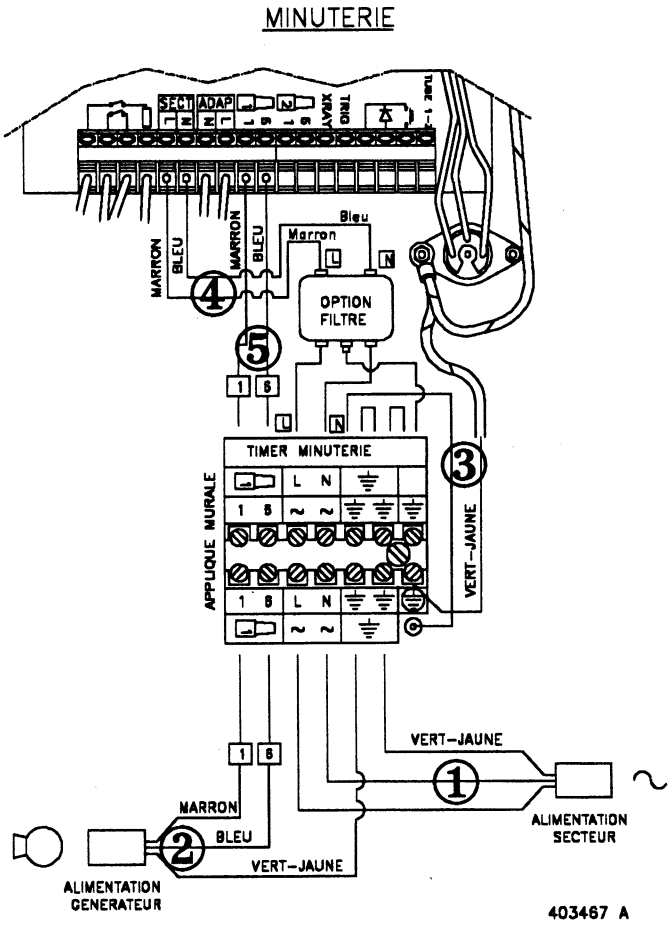
MINUTERIE	TIMER	MARRON	BROWN
OPTION FILTRE	FILTER OPTION	BLEU	BLUE
APPLIQUE MURALE	WALL BRACKET	VERT-JAUNE	GREEN-YELLOW
ALIMENTATION GENERATEUR	GENERATOR POWER SUPPLY	JAUNE	YELLOW
ALIMENTATION SECTEUR	MAINS POWER SUPPLY		
BOÎTIER DE LA MINUTERIE .	TIMER HOUSING		

INSTALLATION

2.2. ELECTRICAL CONNECTION

2.2.1. Standard wiring

- Connect the mains power supply **(1)** on the screw connector of the wall bracket::
  - . blue wire to N
  - . brown wire to L
  - . green-yellow earth wire to one of the earth terminals.
- Connect the generator power supply **(2)** on the screw connector of the wall bracket:
  - . blue wire (ring marked 6) to 6
  - . brown wire (ring marked 1) to 1
  - . green-yellow earth wire to one of the earth terminals.
- Attach the above two wires (L and N) by passing them under the strap on the wall bracket.
- On the timer:
  - . connect the green-yellow earth wire to one of the spare earth terminals
  - . connect the power supply wires **(4)** on the screw connector of the wall bracket or on the filter (*):
    - blue wire to N
    - brown wire to L
  - . connect the generator control **(5)**:
    - wire with ring marked 1 to 1
    - wire with ring marked 6 to 6.
- The timer is then connected to its wall bracket; install it at a height such that the wires are not taut.



- After making the connections, bind all L and N power supply wires (on the wall bracket and timer) together with a plastic clip as close as possible to the connector.

☞ ***It is mandatory to respect the power supply cable polarities 1 and 6 on both the wall bracket and the timer.***

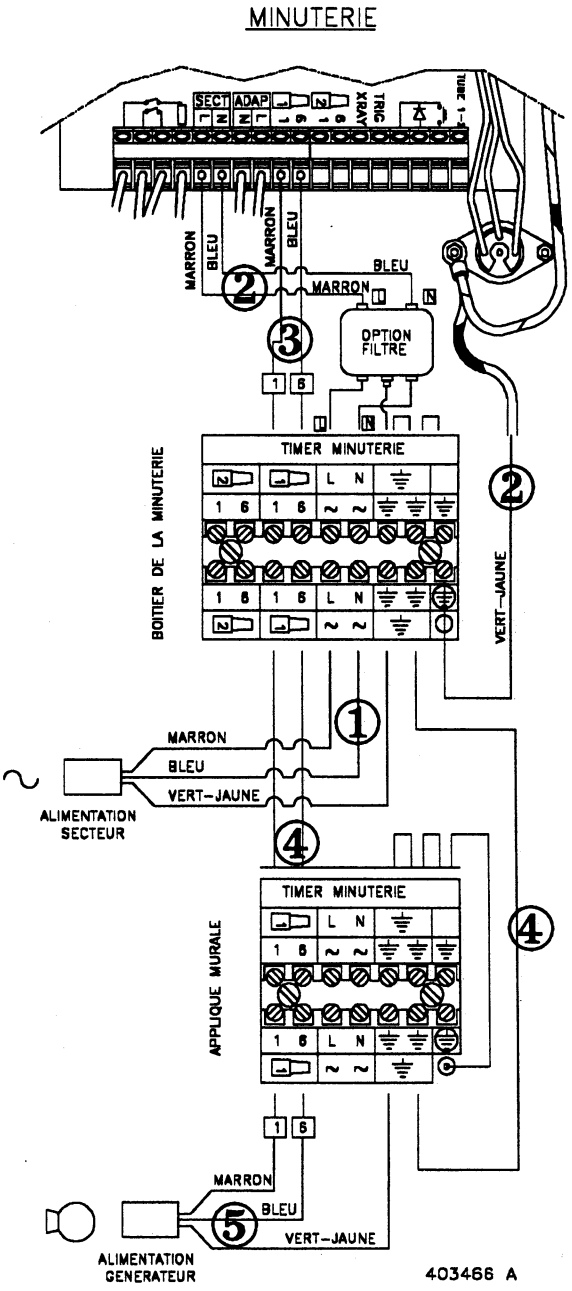
☞ ***Carefully connect the earth and check the continuity using an ohmmeter.***

☞ ***THE UNIT MUST BE CONNECTED TO EARTH***

(*) : the filter is present or not according to the country.

2.2.2. Wiring with the "timer in separate box" option

- Connect the mains power supply **(1)** to the connector of the timer housing:
  . blue wire to N
  . brown wire to L
  . green-yellow wire to one of the earth terminals.
- Connect the timer to the connecteur of the housing:
  . Power supply **(2)**:
    - green-yellow earth wire to one of the spare earth terminals
    - blue wire to N of the connector or on the filter (*)
    - brown wire to L of the connector or on the filter (*)
  . Generator control **(3)**:
    - wire with ring marked 1 to 1
    - wire with ring marked 6 to 6
- Having connected the timer to the wall bracket, install it at a height such that the wires are not taut.
- Connect the link cable **(4)** between the timer and the wall bracket, wire by wire.
- Connect the generator power supply **(5)** on the screw connector of the wall bracket:
  . blue wire (ring marked 6) to 6
  . brown wire (ring marked 1) to 1
  . green-yellow earth wire to one of the earth terminals.
- Attach the above wires by passing them under the straps on the wall bracket and in the timer housing.
- After making the connections, bind the L and N power supply wires (on the wall bracket and timer) together with a plastic clip placed as close as possible to the connector.



☞ ***It is mandatory to respect the power supply cable polarities 1 and 6 on both the wall bracket and the timer.***

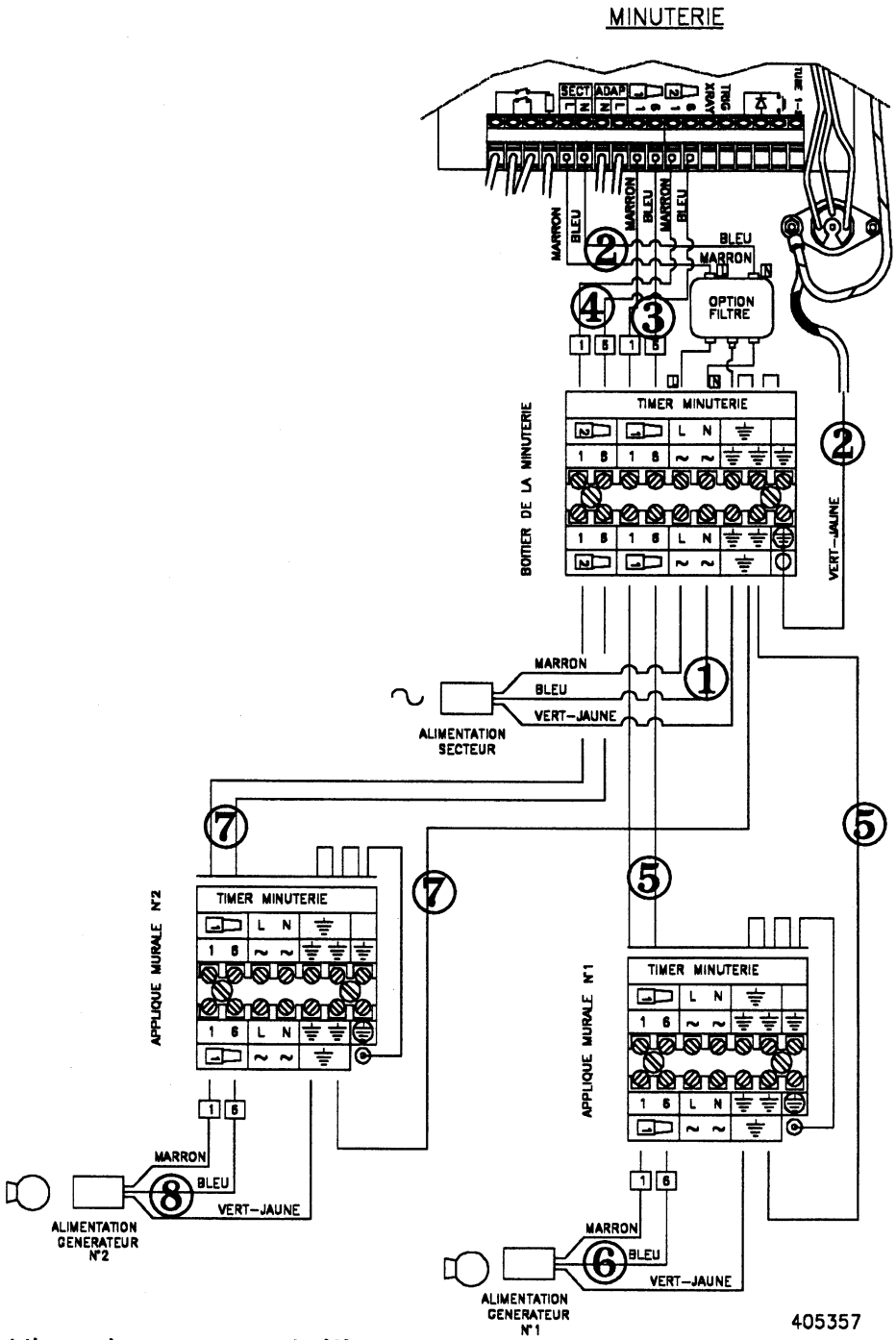
☞ ***Carefully connect the earth and check the continuity using an ohmmeter.***

☞ ***THE UNIT MUST BE CONNECTED TO EARTH***

(*) : the filter is present or not according to the country.

INSTALLATION

2.2.3.Wiring with the dual tube option



- Connect the mains power supply **(1)** to the connector of the timer housing:
  . blue wire to N
  . brown wire to L
  . green-yellow wire to one of the earth terminals.

- Connect the timer to the connecteur of the housing:
  . Power supply **(2)**:
    - green-yellow earth wire to one of the spare earth terminals
    - blue wire to N of the connector or on the filter (*)
    - brown wire to L of the connector or on the filter (*)
  . Generator N°1 control **(3)**:
    - wire with ring marked 1 to 1
    - wire with ring marked 6 to 6

. Generator N°2 control **(4)**:
- wire with ring marked 1 to 1
- wire with ring marked 6 to 6

- Having connected the timer to the wall bracket, install it at a height such that the wires are not taut.
- Connect the link cable **(5)** between the timer and the wall bracket N°1, wire by wire.
- Connect the generator N°1 power supply **(6)** on the screw connector of the wall bracket N°1:
  . blue wire (ring marked 6) to 6
  . brown wire (ring marked 1) to 1
  . green-yellow earth wire to one of the earth terminals.
- Connect the link cable **(7)** between the timer and the wall bracket N°2, wire by wire.
- Connect the generator N°2 power supply **(8)** on the screw connector of the wall bracket N°2:
  . blue wire (ring marked 6) to 6
  . brown wire (ring marked 1) to 1
  . green-yellow earth wire to one of the earth terminals.
- Attach the above wires by passing them under the straps on the wall bracket and in the timer housing.
- After making the connections, bind the L and N power supply wires (on the wall bracket and timer) together with a plastic clip placed as close as possible to the connector.

☞ ***It is mandatory to respect the power supply cable polarities 1 and 6 on both the wall bracket and the timer.***

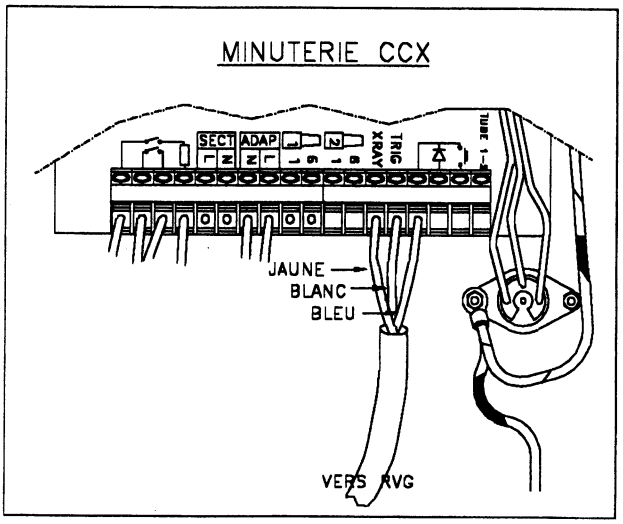
☞ ***Carefully connect the earth and check the continuity using an ohmmeter.***

☞ ***THE UNIT MUST BE CONNECTED TO EARTH***

(*) : the filter is present or not according to the country.

2.2.4.Wiring the RVG link

Connect the synchronisation cable of the RVG on the connector of the timer.



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3. ELECTRICAL CALIBRATION

- Measure the line voltage:
  - Use an AC voltmeter with a range of 0 to 300 Volts and accurate to within 1.5 Volts.
  - Connect the voltmeter across the timer connector terminals L and N.
- Switch the timer on and note the voltmeter reading (off-load voltage). Set the film selector to position 9 and the program exposure on tooth 27-28.
- Move behind the generator.
- Trigger the exposure. Note the voltmeter reading (on-load voltage) during emission of the X-rays.

  The ratio: $\frac{V_{off\text{-}load} - V_{on\text{-}load}}{V_{on\text{-}load}} \times 100$ must not exceed 3%. If this value is exceeded, a heavier-gauge power supply cable must be used.

- Fix the timer, with its housing, on the wall bracket using the two socket-head screws and taking care not to jam the cables under the housing. Connect the handswitch.
- Reinitialize the microprocessor:
  - Turn the timer off
  - Press keys 11/12 and 21/22 and simultaneously turn the timer on
  - Keep the keys pressed until you hear the relay trip. Release the keys.
  - Program a tooth and generator no. 1
- Complete installation by cleaning the unit and carrying-out the checks described in "Preventive Maintenance".

IV. PREVENTIVE MAINTENANCE

This unit has been designed to be easy to use and to provide maximum diagnostic capabilities.

To guarantee a correct and safety working of this unit, preventive maintenance has to be done on a first level every year and on a second level every two years.

It is the responsability of the user to control the maintenance schedule.

Contact your authorized Trophy dental representative who will give you a maintenance certificate, dated and signed, with the detailled controls and repairs done.

1. CLEANING

- Use an alcohol-based **non-corrosive** product.

2. FIRST LEVEL MAINTENANCE - YEARLY

2.1.GENERATOR

- check that the certification label is intact
- check that there is no oil leakage
- check that the beam limiting device is correctly attached to the generator and maintains a distance of at least 0.8" (20 cm) between focal spot and skin
- check that the black plastic locking collar which attaches the generator to the arm is correctly positioned and the screw is tight (if incorrectly attached, the generator could fall and cause injury).

2.2.SUPPORT AND SCISSOR ARM

- check that the wall bracket is securely attached to the wall (or ceiling, floor or unit as appropriate). Alternatively, check that the mobile stand on which it is mounted is stable.
- check the scissor arm in all positions and adjust it if necessary
- if your scissor arm is making any noise, call your TROPHY representative for a quick intervention
- if the rotation of your generator is difficult, call your TROPHY representative for a quick intervention
- For an installation with an extension arm of 31-1/2 in., check that the 360 ° rotation of the scissor is retricted by the stops mounted on the extension arm to prevent the cables being ripped out.

2.3.TIMER

- make sure the label is clearly visible
- check the condition of the handswitch and its cord
- Switch the timer on.
- Check that the green "power" light comes on.
- Select tooth 27-28 and type 5 film and then trigger exposure.
  Check that the "X-ray" light comes on during exposure, the counter automatically decrements to zero and the audible signal stops at the end of X-ray emission.

- Trigger an exposure and check that the red "operator error" light comes on and that an audible signal, different to the previous signal, sounds when the handswitch button is released before the end of exposure since. In normal use, the handswitch button must be kept pressed until the end of the exposure.

2.4.SELF-TEST

- Switch the timer off.
- Press RVG button and simultaneously switch the timer on.
  Wait for tooth 41-42 to lit before releasing the RVG button.
  All the timer functions and lights will automatically be tested (except the "X-ray" indicator light and alarm light no. 3 which indicates a microprocessor alarm; these functions are tested but the lights do not come on).
  A short audible signal is generated at the end of the test cycle.

If any of the lights or the audible signal does not work, contact your TROPHY representative.

2.5.ELECTRICAL INSTALLATION

- check that all grounding points are correctly connected
- check that the main voltage is within the limits given in the installation manual

☞ ***After completing this preventive procedure, check that your* user's manual *is available close to the unit.***

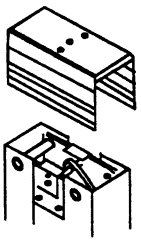
☞ ***If the results of any of these checks are unsatisfactory, call a qualified technician from your TROPHY representative for corrective action.***
In the meantime, it is strongly recommended to not use the unit.

3. SECOND LEVEL MAINTENANCE - EVERY TWO YEARS

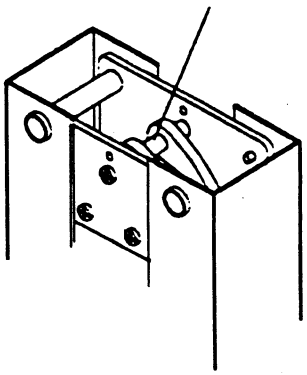
☞ ***This maintenance must be done by a qualified technician from your authorized TROPHY distributor.***

☞ ***If the results of any of these checks are unsatisfactory, call a qualified technician from your TROPHY representative for corrective action.***
In the meantime, it is strongly recommended to not use the unit.

3.1.CENTRAL AXIS WEAR CHECK

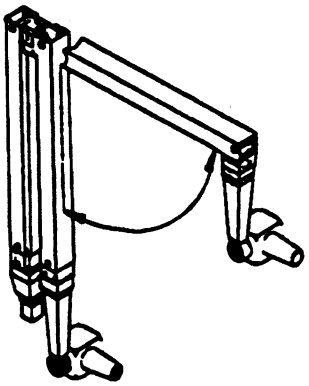


- Remove the central plastic cover.



- Check that the axis does not roll when moving the arm as shown aside.

- If the axis rolls or the movement is noisy, this is an indication of a wear which can cause the genetor to fall down.

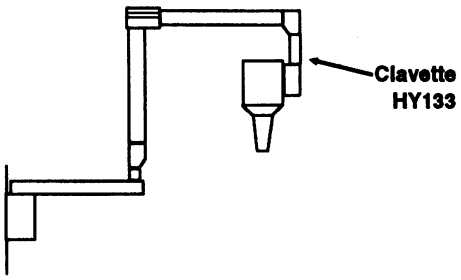


☞ ***An exchange of the complete arm has to be done as soon as possible.***

3.2.ARM BALANCE AND SPRING TENSION

- Check that the arm is flexible in all positions and that it remains immobile when no longer handled.
- In case of problem, adjust the spring tension as requested.

3.3.GENERATOR ROTATING CONTACT



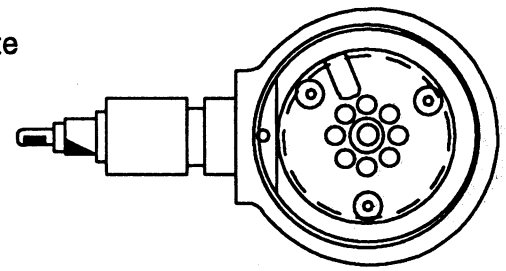
- Set the arm as shown aside.

☞ ***Never use an other arm position.***

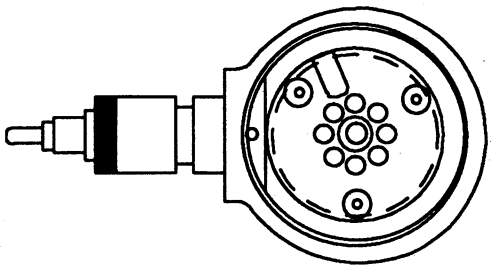
- Remove the plastic key HY133 fixing the generator on the arm.
- Remove the generator.

☞ ***If there is a problem when removing the generator, exchange the complete assembly arm and generator.***

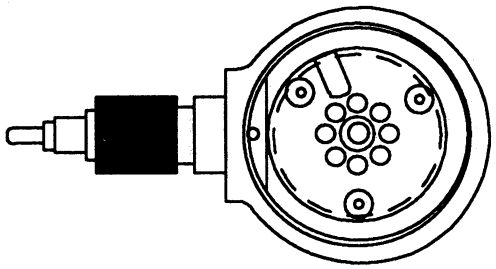
- Using alcohol clean the contacts of the generator and its pivot.
- Check carefully the following:
  NOTE: the black parts on the drawings indicate the concerned parts.
  - Black marks on the contact



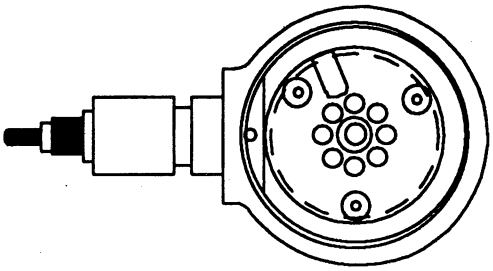
  - Seizing marks on the pivot



- In case of seizing,
  - Clean carefully using emery cloth, 180 grain, until the marks desappear.
- Slightly grease the pivot using high quality mechanical grease, WYNN's HP type.



- Slightly grease the contacts using a special 1,000 V grease.
  This grease is available from TROPHY.



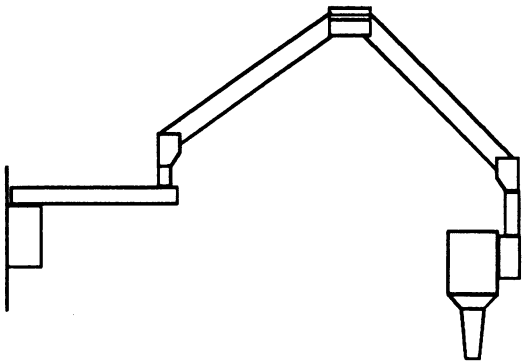
- Using alcohol clean carefully the inner part of the arm.
- Remount the generator. Carefully set the key.
- Check if the generator moves smoothly.

3.4.GENERATOR POWER SUPPLY CABLE

- Ckeck the cable for wears and tears, overall at the articulation points of the arm.
- In case of problem, change the cable.

3.5.EXTENSION ARM'S HORIZONTALITY

- Set the scissor arm in the position shown aside.
  The arm half extended must remain in the same position during its horizontal rotation movement



- In the same starting position, using a spirit level placed on the extension arm, check the arm's horizontality during its horizontal rotation.

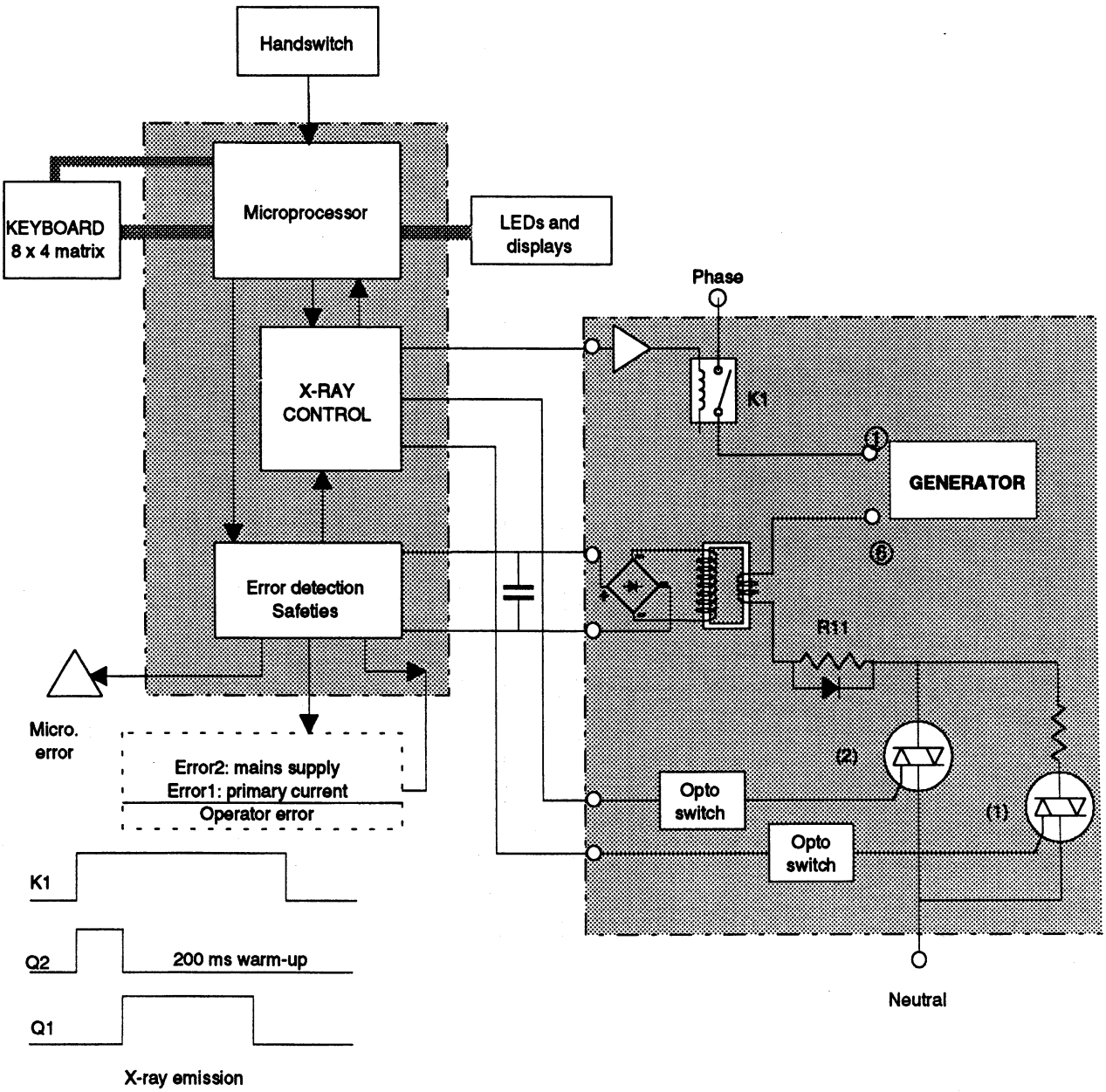
☞ ***In case of problem, remove the generator and verify all the mounting procedure, see Installation and maintenance manual.***

3.6.WALL BRACKET MOUNTING

- Placing and moving the arm in the worse conditions, fully extended and complete rotation, check that the wall bracket remains stable on the wall.

☞ ***In case of problem, remove the generator and verify all the mounting procedure, see Installation and maintenance manual.***

V. CORRECTIVE MAINTENANCE



☞ ***You can obtain a complete technical file, diagrams and data, about the IRIX 70 unit by simply requesting it from TROPHY.***

1. SIMPLIFIED EXPLANATION OF OPERATION

These paragraphs briefly describe the operation of the TROPHY X-ray unit and give a general understanding of the system.

Exposure sequence:

1 - Switch the X-ray unit on

- The "power" light comes on
- The generator no. 1 light and the lights indicating the last teeth and type of film selected also come on

2 - Select your program

- Select a tooth
- Select a type of film

3 - Press the handswitch button

- Safety relay is energized
- Circuit (1) is energized to warm-up the filament
- Circuit (2) is energized to start the exposure time and circuit (1) is de-energized
- X-ray emission begins

4 - End of exposure

- Circuit (2) is de-energized
- X-ray emission stops and the "X-ray" light goes out; the audible signal also stops
- Release the handswitch
- Safety relay is de-energized

2. DIAGNOSTIC

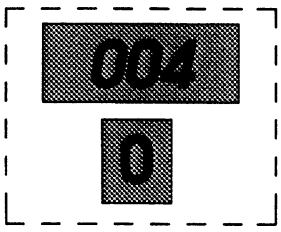
2.1. TIMER SELF-TEST

- Switch the timer off.
- Press button RVG and simultaneously switch the timer on.
- Wait for tooth 41-42 to light before releasing the RVG button.

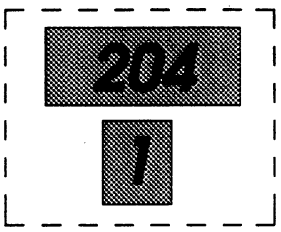
  All the timer functions and lights are automatically tested (except the "X-ray" light and alarm light no. 3 which indicates a microprocessor alarm; these are tested but do not come on). The relays which control selection of generator no. 1 or no. 2, the audible signal and the digital displays are also tested.

  As part of the automatic light test, the total number of exposures since the timer was installed is displayed (in increments of 10). The format is as follows:

  – exposure time display: thousands, hundreds and tens
  – film type display: tens of thousands
  – For example:



indicates between 40 and 50 exposures.



indicates between 12040 and 12050 exposures.

  – The limit is 99999 exposures.

- A short audible signal sounds at the end of the test cycle.

If any of the lights or the audible warning does not operate correctly, contact your approved TROPHY agent.

2.2. CLEARANCE OF ALARMS

- The operator error alarm and the corresponding audible signal are cleared by pressing any of the keys on the dental arch:
  – Operator error: handswitch bulb released too soon.
- Alarms 1, 2 or 3 and the corresponding audible signal are cleared by switching the timer off.
  – Alarm 1: generator primary current too high
  – Alarm 2: mains voltage outside limits or mains synchronisation problem
  – Alarm 3: microprocessor problem

2.3. ALARM RECORDS

This procedure allows a technician to determine the number of alarms since the last reinitialization. The timer cannot be used normally so long as this program is active.

- Switch the timer off.
- Press the two film type selector buttons and simultaneously switch the timer on.
- Wait for the display to come on again before releasing the film type buttons.
  The following information is then cyclically displayed on the exposure time displays.

Press	MEANING
	"Cur" is alternately displayed with a number which indicates the number of n° 1 alarms (current) that have occurred since the last timer reinitialization
Button RVG	Message **"Alh"** alternates with a number which indicates the number of n° 2 alarms (line overvoltage) that have occurred since the last timer reinitialization
Button RVG	Message **"Err"** is displayed alternately with a number which indicates the number of "operator error" alarms which have occurred since the last timer reinitialization
Button RVG	Message **"Alb"** alternates with a number which indicates the number of n° 2 alarms (line undervoltage) that have occurred since the last reinitialization
Button RVG	Message **"Sho"** alternates with a number which indicates the number of synchronisation problem alarms that have occurred since the last reinitialization
Button RVG	Message **"Et1"** alternates with a number which indicates the number of tens of Joules accumulated in tube N°1
Button RVG	Message **"Et2"** alternates with a number which indicates the number of tens of Joules accumulated in tube N°2
Button RVG	Message **"Un"** alternates with a number which indicates the ratio between the measured voltage and the nominal voltage
Button RVG	The cycle continues and the **"Cur"** message reappears
Any key on the arch	To return to normal operation

☞ ***CAUTION:*** *The CCX digital timer memorizes the last set of parameters selected before the unit was switched off. Consequently, if one of the timer buttons is not pressed to quit the internal diagnostic program before switching off the timer, this mode will automatically be selected when the timer is switched on again.*

☞ ***CAUTION:*** *Re-initializing the microprocessor resets all the alarm counters to zero. This must only be done by TROPHY or by an approved TROPHY technician. You are strongly advised not to re-initialize the microprocessor unnecessarily since the diagnostic will no longer be possible.*

3. TROUBLESHOOTING

SYMPTOMS	POSSIBLE CAUSES	CORRECTIVE ACTION
No lights come on when the unit is switched on	No voltage across L and N in the wall bracket electrical connector	The line circuit-breaker is open
		No power supply to the line
		Power supply cables connected incorrectly
	The timer switch is set to "O" (OFF)	Set the switch to "I"
	The fuse on the timer front panel has blown	Replace the fuse by an equivalent one: - 220 V: 6.3 A / 250 V - 110 V: 10 A / 125 V
	The fuse F2 on the timer power board has blown	Remove the timer from the wall bracket and replace the fuse by an equivalent one: - 220 V: 160 mA delayed-blow /250 V - 110 V: 250 mA delayed-blow /250 V
	No voltage across the two contacts on the right of the switch	Switch faulty: change it
	Voltage selector jumper J4-J6 on the power supply board missing	Place the jumper opposite the required voltage
One or several keys do not work (no indicator light or audible signal)	The flat cable between the front panel and the micro-processor board is badly connected or crushed	Reposition it or change the front panel
Alarm n° 3 lights and the audible signal sounds	The microprocessor has failed	Change the timer
Alarm n° 2 lights, the audible signal sounds and "**Alh**" is displayed	Voltage selector jumper J4-J6 on the power supply board is wrongly positioned	Set it to the appropriate position for the mains supply on the site
	The mains voltage is briefly too high	Check the electrical installation

SYMPTOMS	POSSIBLE CAUSES	CORRECTIVE ACTION
Alarm n° 2 lights, the audible signal sounds and "Alb" is displayed	Power selector jumper J4-J6 on the power supply board is wrongly positioned	Set it to the appropriate position for the voltage on the site
	The mains voltage is briefly too low	Check the electrical installation
No X-ray emission and no alarm when the handswitch is pressed	Handswitch incorrectly connected to the timer	Plug the handswitch back into the DIN connector
	There is a fault in the line between the handswitch DIN socket and the terminal strip on the power board (three-wire flat cable)	Check the cable connections and continuity. Change the cable if necessary
	The flat cable between the front panel and the mircroprocessor board is incorrectly connected or crushed	Reposition it or change the front panel
	If the light for the tooth selected flashes, the generator is still cooling down	Wait for the light to stop flashing (a few seconds)
The "operator error" light comes on and the audible signal sounds	The handswitch button has been released before the end of the X-ray emission	Repeat the exposure
	The flat cable between the front panel and the microprocessor board is incorrectly connected or crushed	Reposition it or change the front panel
Alarm n° 1 lights, the audible signal sounds and **"Cur"** is displayed	No power supply to the generator	Check generator connections taking care to correctly tighten the key
	Cables 1 and 6 wrongly connected to the generator or timer	Check the continuity of the generator power supply cable and the connections (1 and 6) on the wall bracket and on the timer
	Voltage drop too high when X-rays are emitted, because the line cable gauge is too small	Install a direct line, using correctly sized wire, between the X-ray unit and the meter
	Generator faulty. Generally, a "clacking" noise can be heard	Change the generator

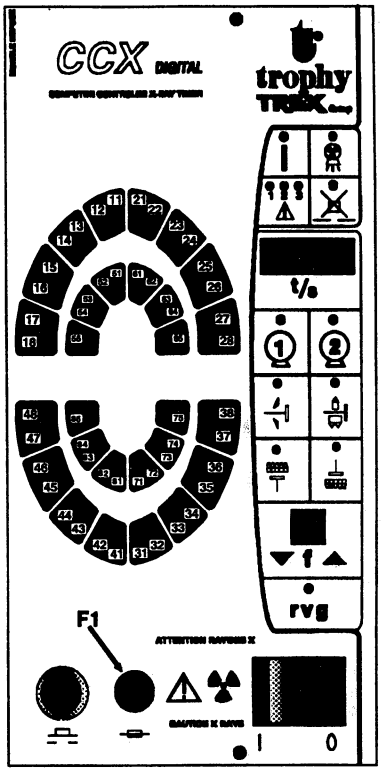
SYMPTOMS	POSSIBLE CAUSES	CORRECTIVE ACTION
Alarm n° 1 lights, the audible signal sounds and **"Cur"** is displayed	Generator power supply cable open-circuit	Lock the scissor arm closed using the strap. Remove the locking collar which attaches the generator to the scissor arm, firmly support the generator from below and remove it. After removing the generator, use an ohmmeter to check: - there is no short-circuit between wires 1 and 6 - the continuity between wire 1 and the central conductor in the connector at the end of the scissor arm - electrical continuity between wire 6 and the outer conductor in the connector at the end of the scissor arm. If a short or open-circuit is found, change the generator power supply cable: see procedure in § 4, page 35 onwards.
Alarm n° 2 lights, the audible signal sounds and **"Sho"** is displayed	Synchronisation problem between the timer and the mains	Check the timer wiring and the mains wiring
		Change the timer
Digital display illegible	The timer has received electrical interference from the mains line	Reinitialize the timer. If the fault occurs frequently, install a direct line.
Film underexposed	"RVG" has been selected on the timer, automatically reducing the exposure time by 80%	Repeatedly press the RVG button until the RVG light goes out: this selects the "film" mode
	Wrong film type selected	Select the type of film used
	Developer and fixer temperature incorrect or spent solutions	Check solution temperatures or replace solutions
	Generator faulty	Change the generator

4. FUSES EXCHANGE

- Switch off the timer and remove the main plug or switch off the main circuit breaker.
- **Timer front panel fuse F1**

  Power circuits fuse
  110 - 130 V : 10 A ; 6,3 x 32
  230 - 240 V : 6.3 A ; 5x20

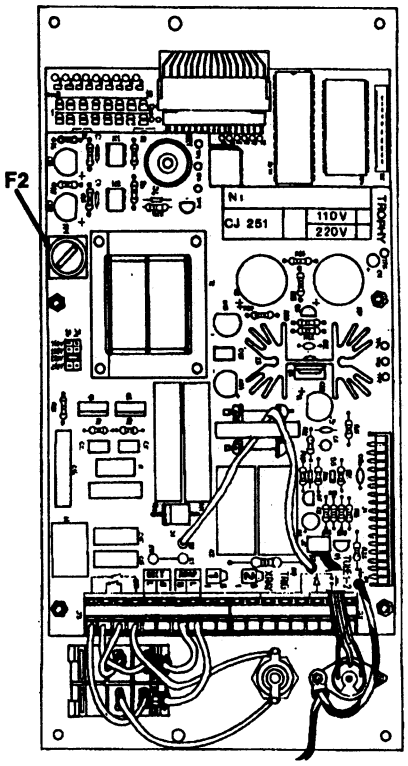
  - Using a screwdriver, remove the fuse cap.
  - Remove the defective fuse.
  - Insert a new fuse, exactly the same type.
  - Screw again the fuse cap.



- **CJ251 PCB fuse F2**

  Control circuits fuse
  110 - 130 V : 250 mA ; 5 x20
  230 - 240 V : 130 mA ; 5x20

  - Remove the cover of the wall bracket using an Allen key 3 mm (.12 in.)
  - The fuse is located on the board.
  - Using a screwdriver, remove the fuse cap.
  - Remove the defective fuse.
  - Insert a new fuse, exactly the same type.
  - Screw again the fuse cap.
  - Remount the wall bracket cover



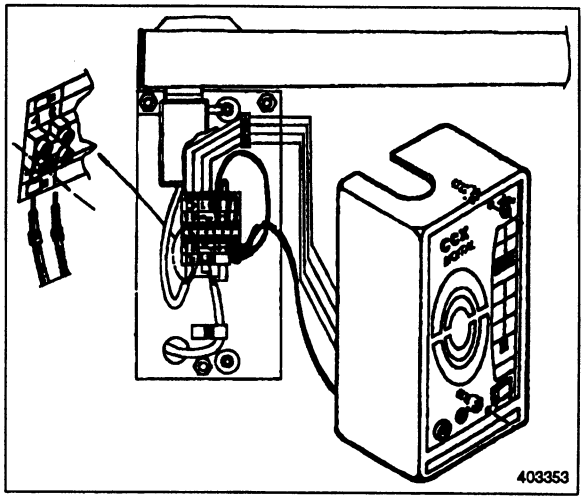
CORRECTIVE MAINTENANCE

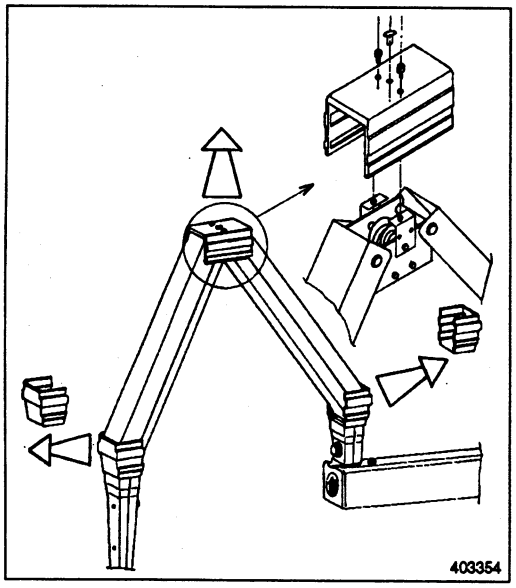
5. PROCEDURE TO CHANGE THE GENERATOR POWER SUPPLY CABLE

1 Switch the timer off.

2 Using a 0.12" (3 mm) Allen key, remove the two socket-head screws which attach the timer to the wall bracket.
Disconnect the earth wire and the 4 connecting wires from the timer. Remove the timer.

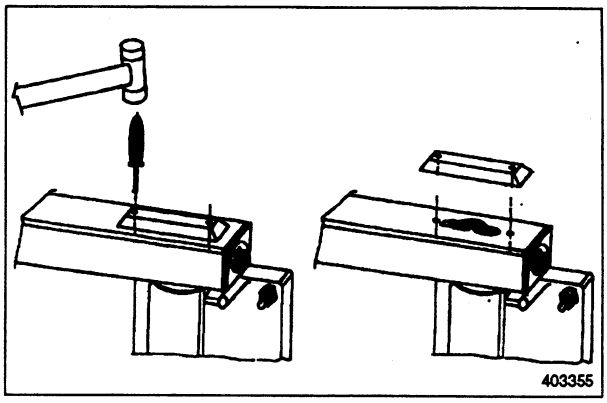
3 On the wall bracket, disconnect the scissor arm wires 1 and 6.

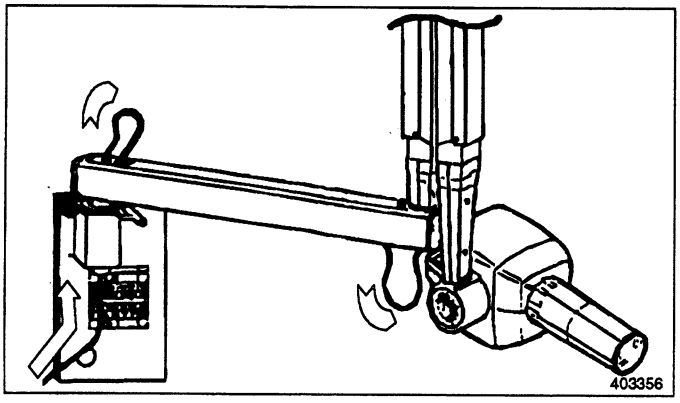




4 Remove the screws from the central plastic cover and remove the two end plastic covers from the scissor arm.

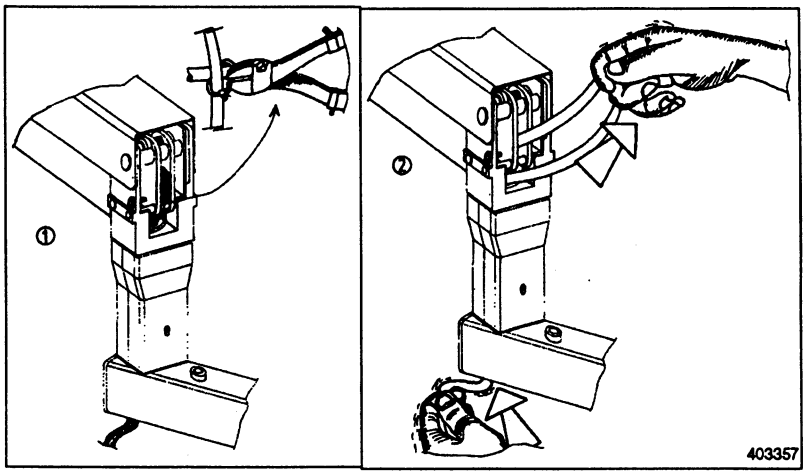
5 Push the plastic pins at the ends of each cover from inside the extension arm and remove the two plastic cable covers. The power supply cable is then visible.

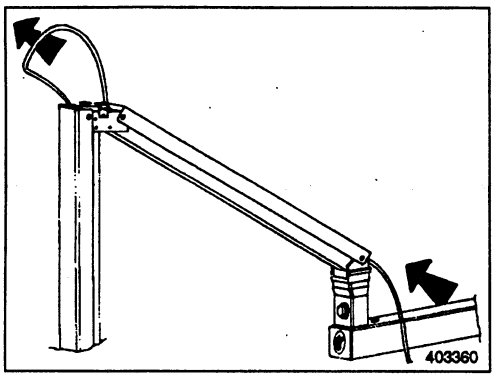




6 Withdraw the cable from the extension arm.

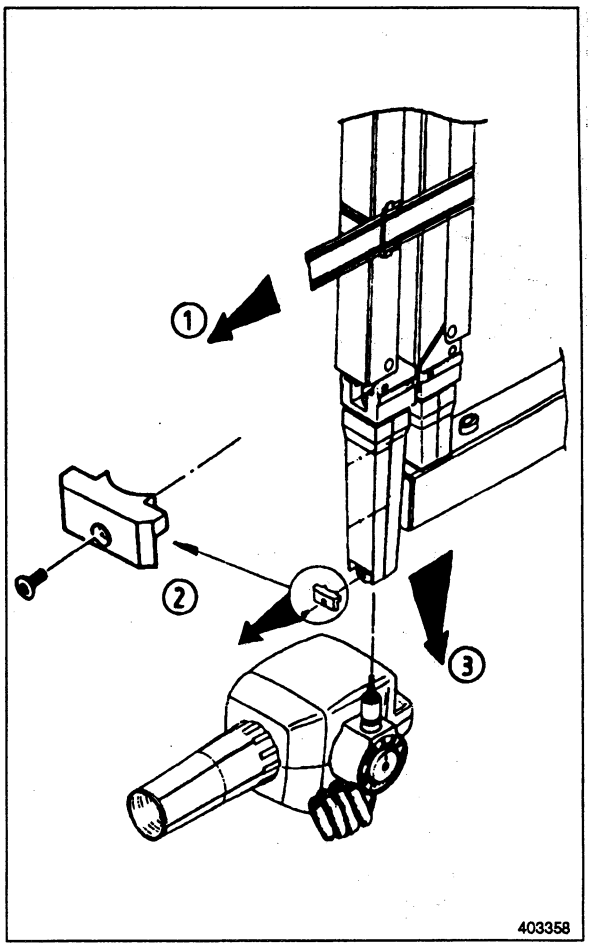
7 Cut the clip which attaches the cable to the scissor arm pivot at the extension arm end.
Withdraw the cable from the extension arm pivot.

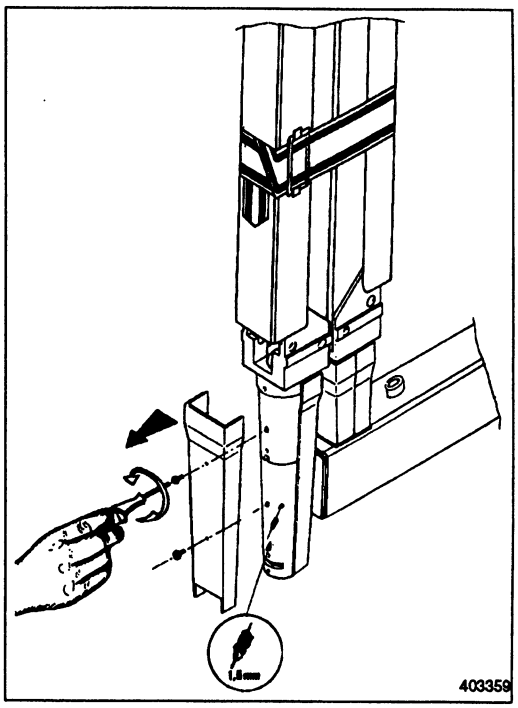




8 Pull the cable out from the top of the scissor arm.

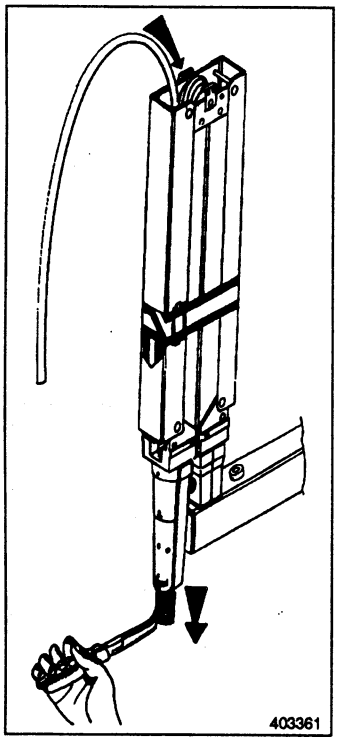
9 Install the strap to keep the scissor arm closed.
Remove the locking collar which attaches the generator to the scissor arm and release the generator: support the generator firmly from below. Remove the generator.





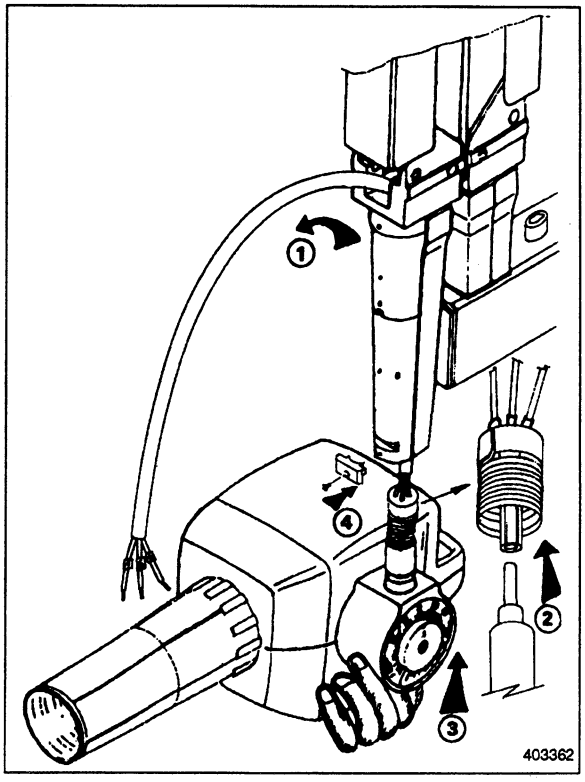
10 Using a screwdriver remove the screws from the plastic cover on the locking collar side (2 screws).

Using a 0.06" (1.5 mm) Allen key, remove the screw which holds the socket on the arm.

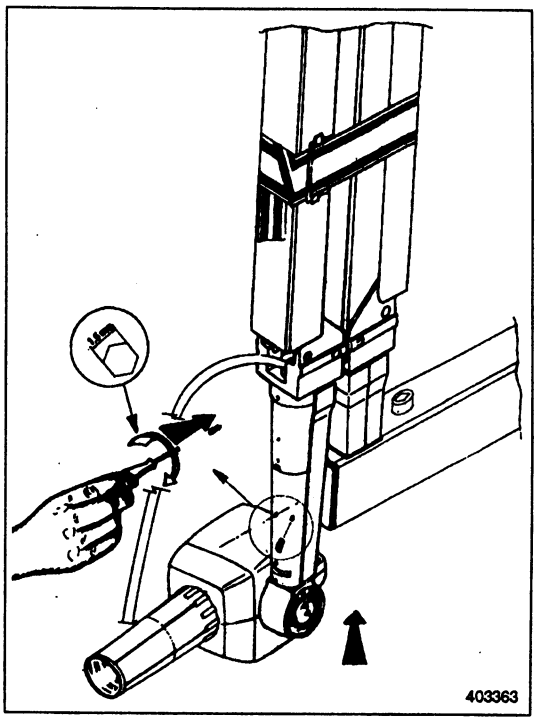


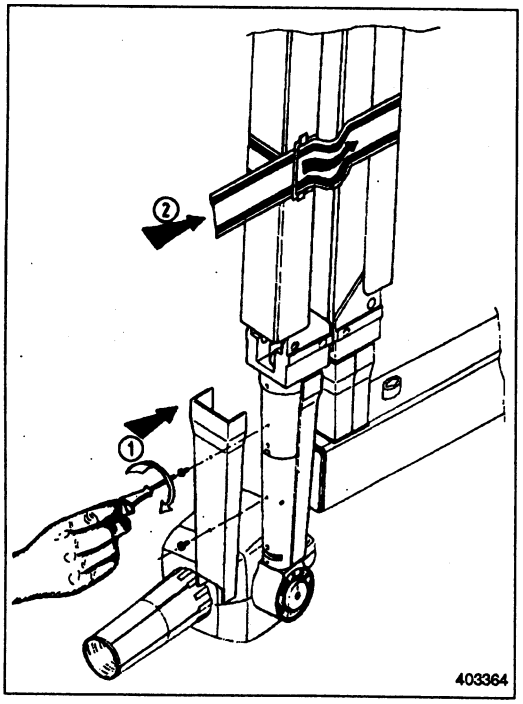
11 Using pliers, pull on the socket in the arm, at the same time pushing the cable into the scissor arm from the top. Withdraw the cable completely.

12 Use a new power supply cable. Do not unsolder the 3 cores since the cable will be then easier to insert into the arm.
Thread the cable into the lower part of the scissor arm, ensuring it exits as shown on the drawing.
Allow the socket to swing outside.
Connect the generator plug to the cable socket.
Push the generator fully home so that the plastic parts on the arm and generator are in contact.
Refit the locking collar (3 mm Allen keys).
Tighten the socket-head screw.



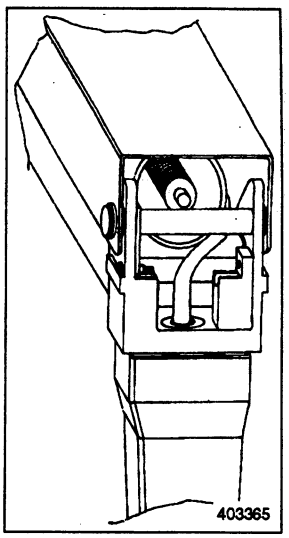
13 Use a new screw to retain the cable socket; tighten this screw firmly to lock the connector in its correct position.

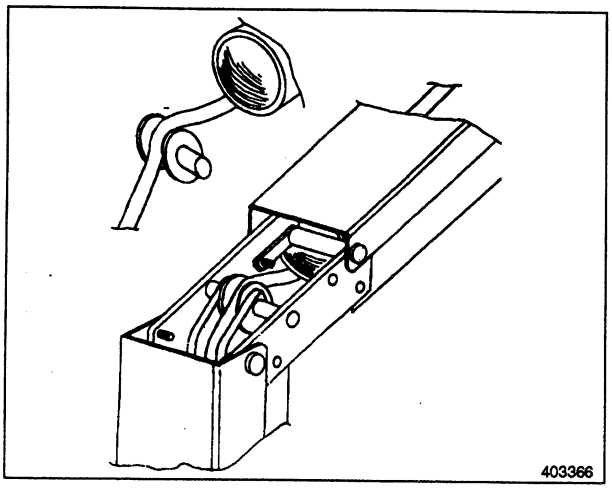




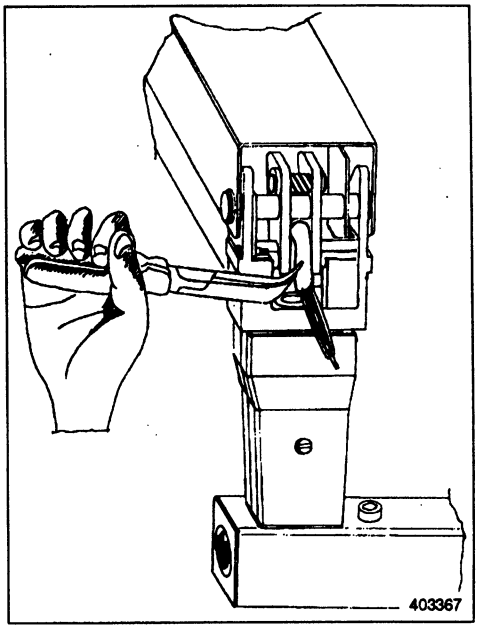
14 Refit the plastic cover (2 screws) and remove the strap.

15 Set the arm horizontal and slide the cable into the scissor arm, at the generator end, placing it alongside the cylinder which contains the compressed spring.

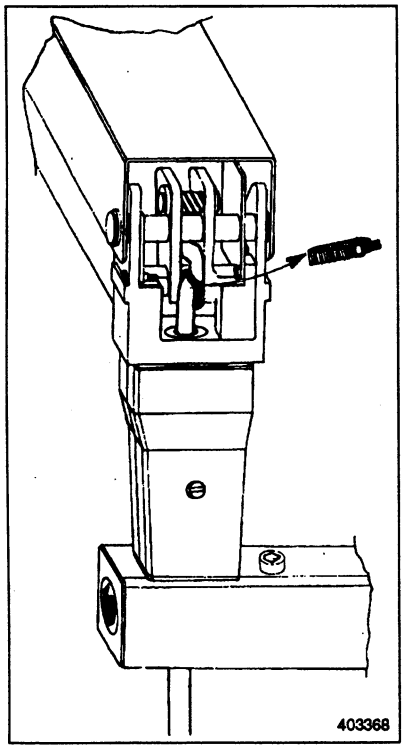




16 In the middle of the scissor arm, thread the cable between the two cardboard washers. Next slide the cable into the wall end of the scissor arm, passing it alongside the cylinder which contains the compressed spring.

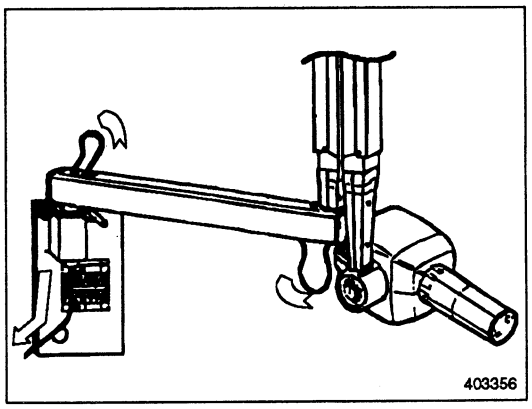


17 Using pliers, draw out the cable so that it runs between the two central parts which support the pivots.

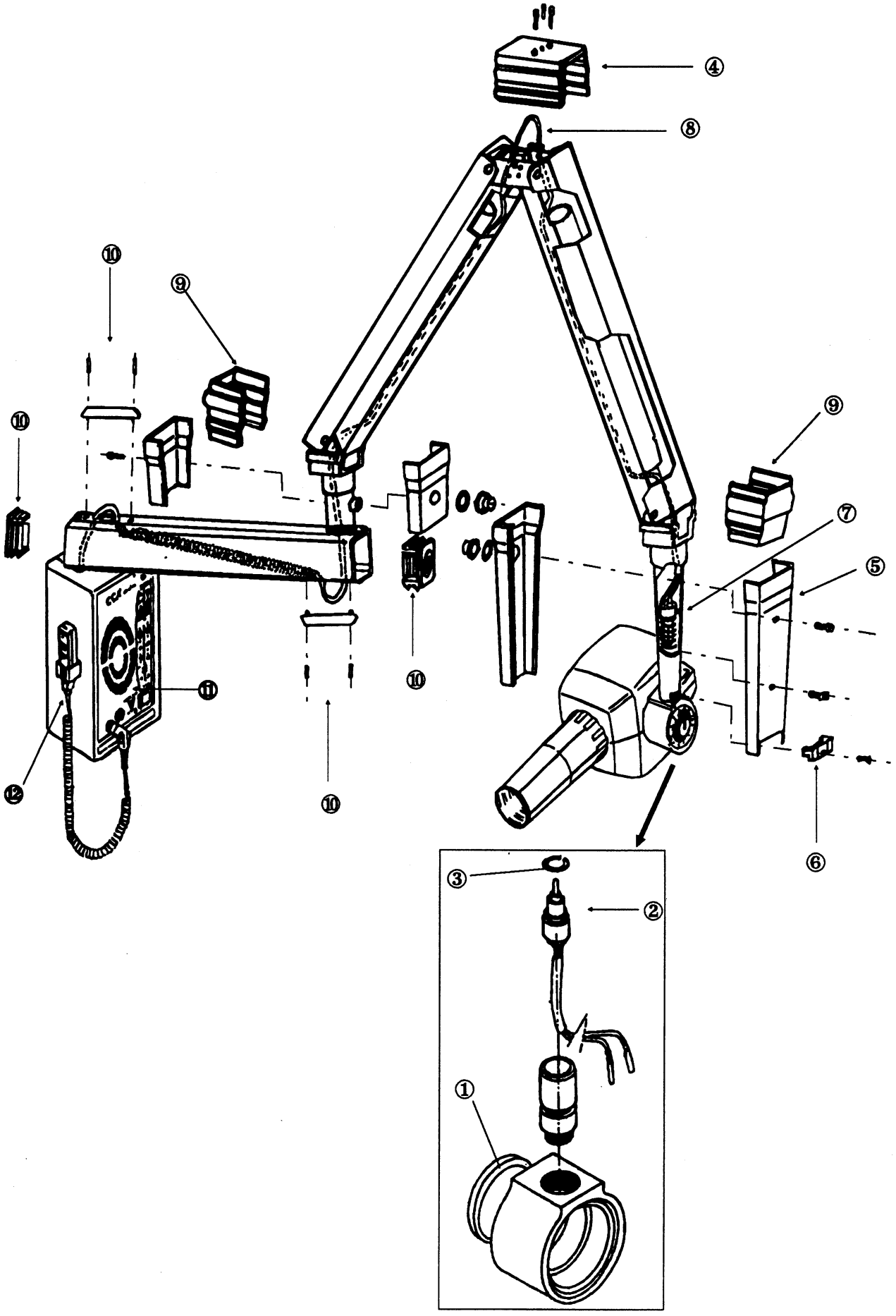


18 Thread the cable into the bottom of the arm so that it exits beneath the extension. Position the arm horizontal and open. Attach the cable to the pivot with a plastic clip.

19 Thread the cable through the extension arm as described on page 14.
Fit two new plastic covers to the extension arm.
Connect wires 1 and 6 to the wall bracket connector (terminals 1 and 6). Also connect the earth wire.
Reconnect the timer (4 wires + earth cable) to the wall bracket connector.
Install the timer on the wall bracket.



VI. LIST OF SPARE PARTS


④
⑧
⑩
⑨
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⑨
⑦
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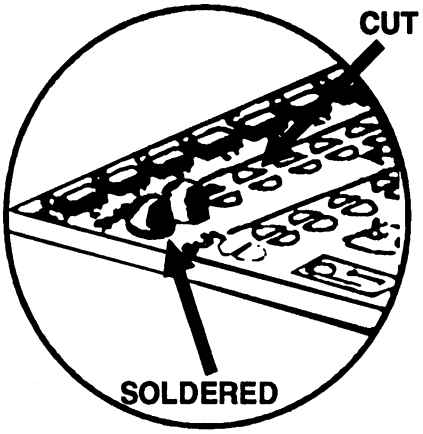
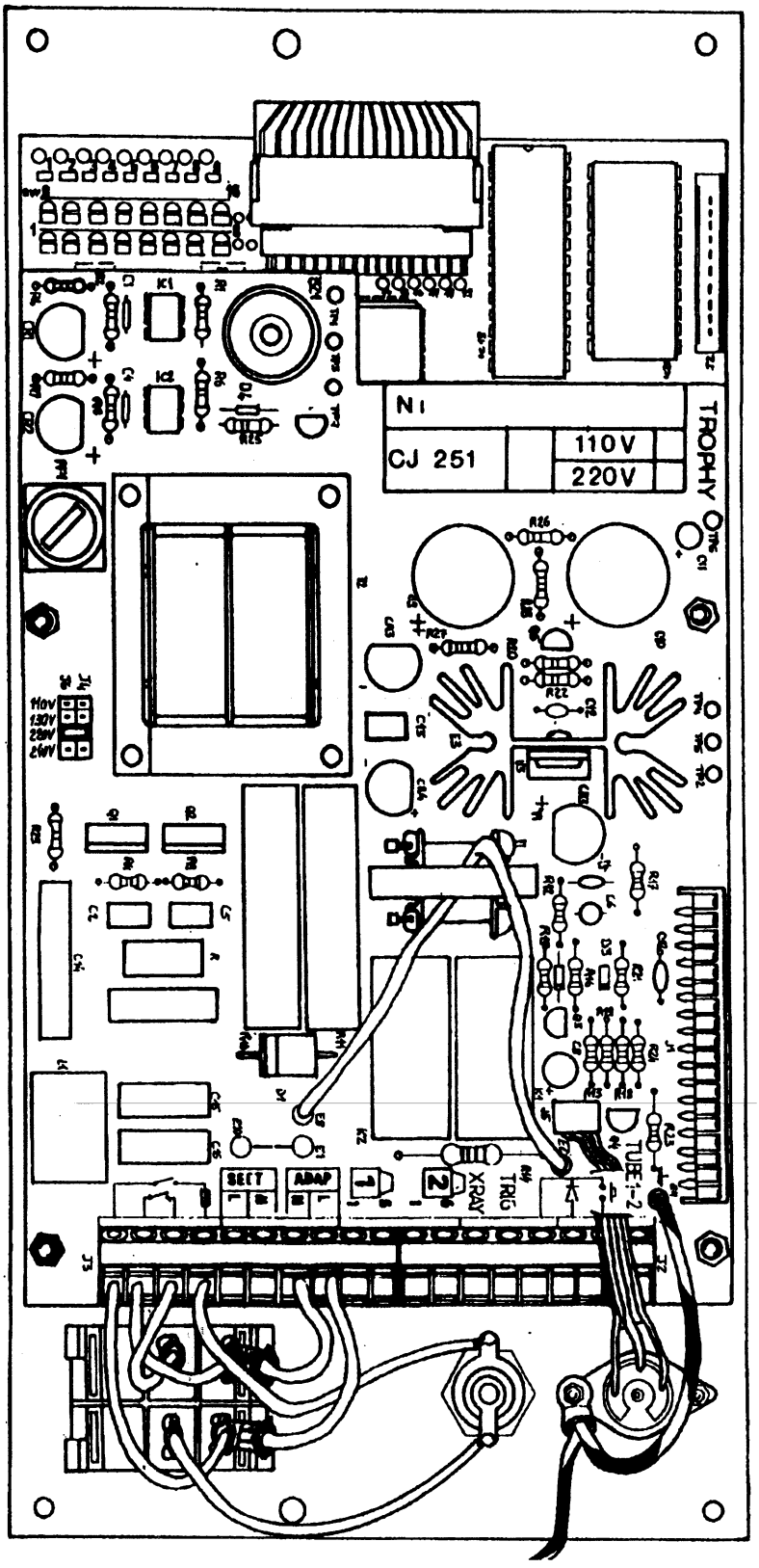
⑪
⑫
⑩
⑩
⑥
③
②
①

DESCRIPTION	ITEM	CODE
GENERATOR BEARING		
1 Teflon washer	①	HY138
1 Plug assembly	②	CG014
1 Clip for the plug assembly	③	DM021
SCISSOR ARM		
1 Central plastic cover	④	HY118
1 Plastic cover for the locking collar	⑤	HY143
1 Generator locking collar	⑥	HY133
1 Power supply cable rotary connector attachment screw	⑦	NK003
1 Generator power supply cable (European standard)	⑧	CP099
2 Lateral plastic covers	⑨	HY119
EXTENSION ARM		
1 Trim kit for scissor arm extension	⑩	CL018
CCX DIGITAL TIMER		
1 Front panel	⑪	JP333
1 Power supply board (220 V)		CJ251
1 Handswitch	⑫	LV082
Wall stiffening plate		HN436

VII. APPENDICES


CUT
SOLDERED


N1
CJ 251
110V
220V
TROPHY
SEET
ADAP
XRAY
TRIG
TUBE-1-2

1. CCX DIGITAL TIMER CONFIGURATION

JUMPER	CUT	SOLDERED
SW1	**DO NOT CHANGE - ALWAYS CUT**	
SW2		
SW3		
SW4		
SW5		
SW6		JAPAN only Max exposure time: 3 seconds
SW7		AUSTRALIA only Max mains variations: ± 10 %
SW8	220 V mains	110 V mains
SW9	**DO NOT CHANGE - ALWAYS CUT**	
SW10		
SW11	RVG enabled	RVG inhibited
SW12	Generator 2 selection inhibited	Generator 2 selection enabled
SW13	Film types from 1 to 9	Film types from 1 to 6
SW14	**DO NOT CHANGE - ALWAYS CUT**	
SW15	Generator consumption monitoring	No generator consumption monitoring
SW16	Control of exposure time to compensate for mains variations	No control of exposure time to compensate for mains variations

VIII NOTES

trophy

4, rue F. Pelloutier - Croissy-Beaubourg
77437 MARNE-LA-VALLÉE Cédex 2 FRANCE
Ph. : + 33 1 64 80 85 00 - Fax : + 33 1 64 80 85 85
Site Internet : http://www.trophy-imaging.com
E-mail : customer-service@trophy-imaging.com

TROPHY BÉNÉLUX	30, avenue des Nymphes - Centre Cial Les Dauphins B 1410 - WATERLOO Ph. : + 32 2 354 15 28 / 68 74 - Fax : + 32 2 353 04 60
TROPHY ESPAÑA S.L.	Calle Pilar de Zaragoza, 15 28028 MADRID Ph. : + 34 91 355 88 09 - Fax : + 34 91 356 89 82
TROPHY GERMANY GmbH	Gerbereistr. 7 D 77694 KEHL-KORK RHEIN - GERMANY Ph. : + 49 78 51 93 970 - Fax : + 49 78 51 939 730
TROPHY ITALIA spa	Via Guarenti, 4 20035 - LISSONE (MI) Ph. : + 39 39 27 80 864 / 877 - Fax : + 39 39 27 80 889
TROPHY RADIOLOGY (UK) Ltd	Unit 3, Block B, Connaught, Business Centre 9, Malham Rd, Forrest Hill LONDON, S.E. 23 1AH/UK Ph. : + 44 1 81 291 99 09 - Fax : + 44 1 81 291 98 00
TREX TROPHY DENTAL DIVISION	37 Apple Ridge Road DANBURY, CT 06810 USA Ph. : + 1 203 207 - 45 45 - Fax : + 1 203 207 - 45 46
TROPHY JAPAN	TOKYO-TO MINATO-KU Toranomon 1-23-7 Toranomon 23 Mori Building JAPAN Ph. : + 81 3 35 80 68 81 - Fax : + 81 3 35 80 68 83

The IRIX 70 is a CE 0459 device

TROPHY S.A. is an ISO9001 - EN46001 company

CJ 249

CARTE CPU

CCX DIGITAL

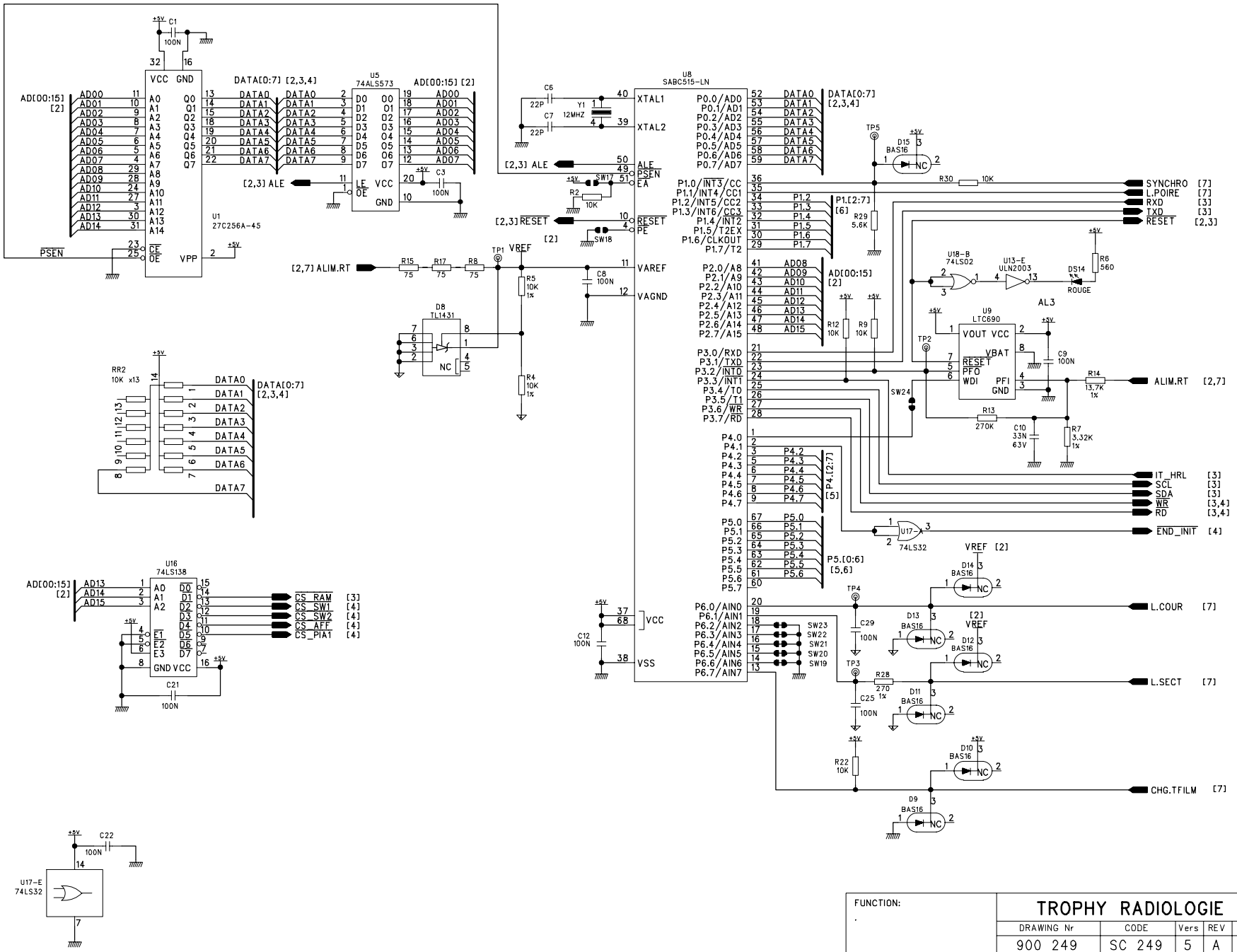
5A	????	DER	28/06/99	CREATION	J. LEMAIRE
IND	AVIS	DRAW	DATE	MODIFICATIONS	APPR.by

MADE: J. LEMAIRE
DATE:21/06/99

FUNCTION:
BLOC DIAGRAM

TROPHY RADIOLOGIE

DRAWING Nr	CODE	Vers	REV	SHEET
900 249	SC249	5	A	1/7



FUNCTION:	TROPHY RADIOLOGIE				
.	DRAWING Nr	CODE	Vers	REV	SHEET
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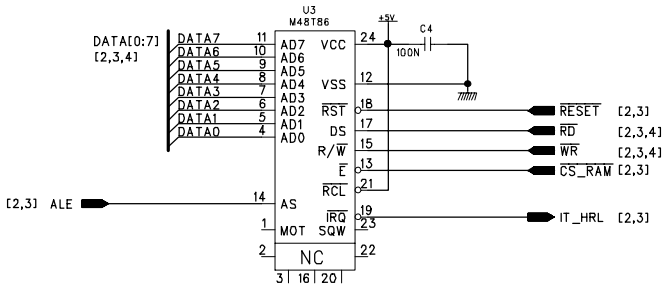
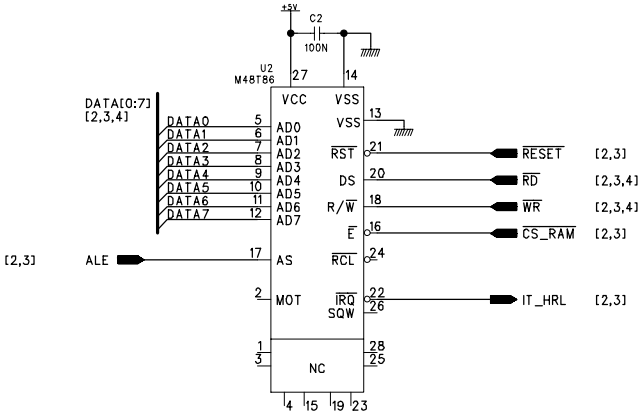
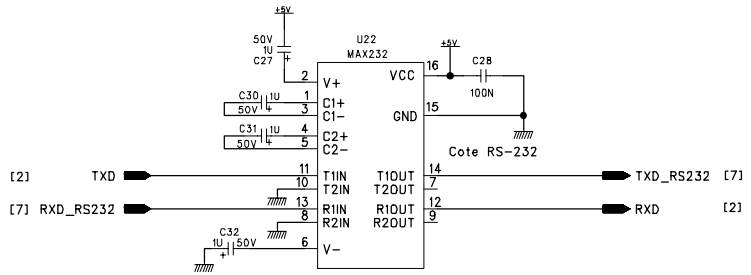
HORLOGE TEMPS REEL + 114 OCTETS RAM

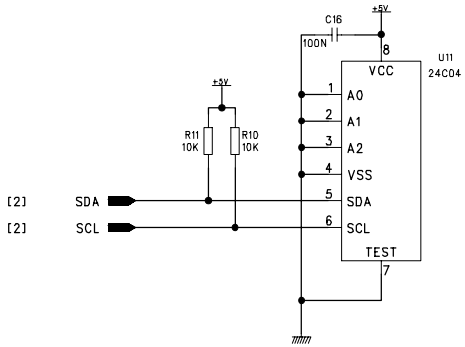




RS232



EEPROM SERIE 512 OCTETS



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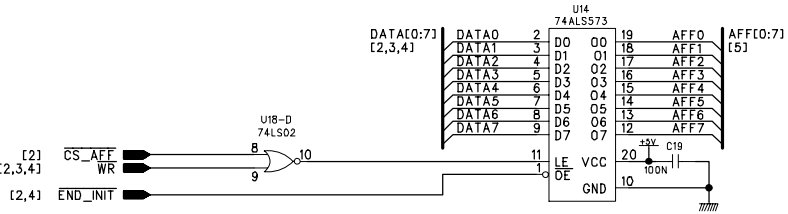
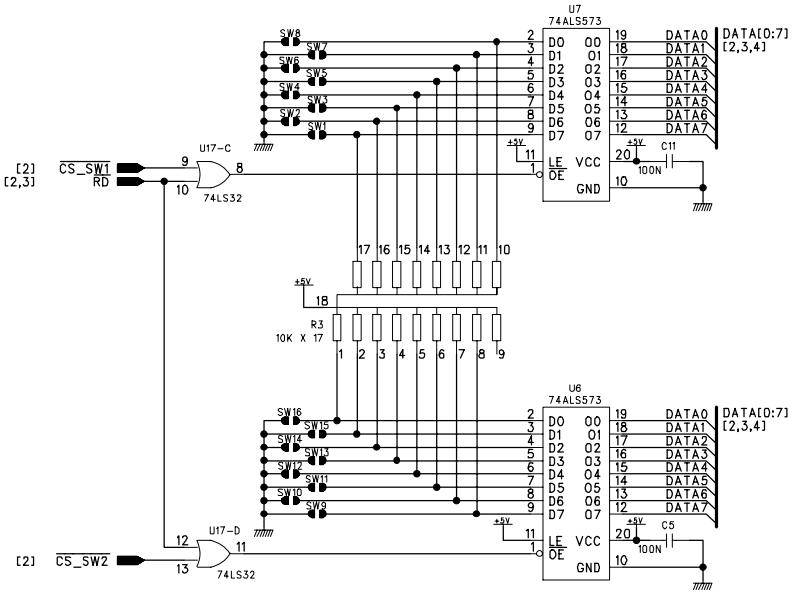
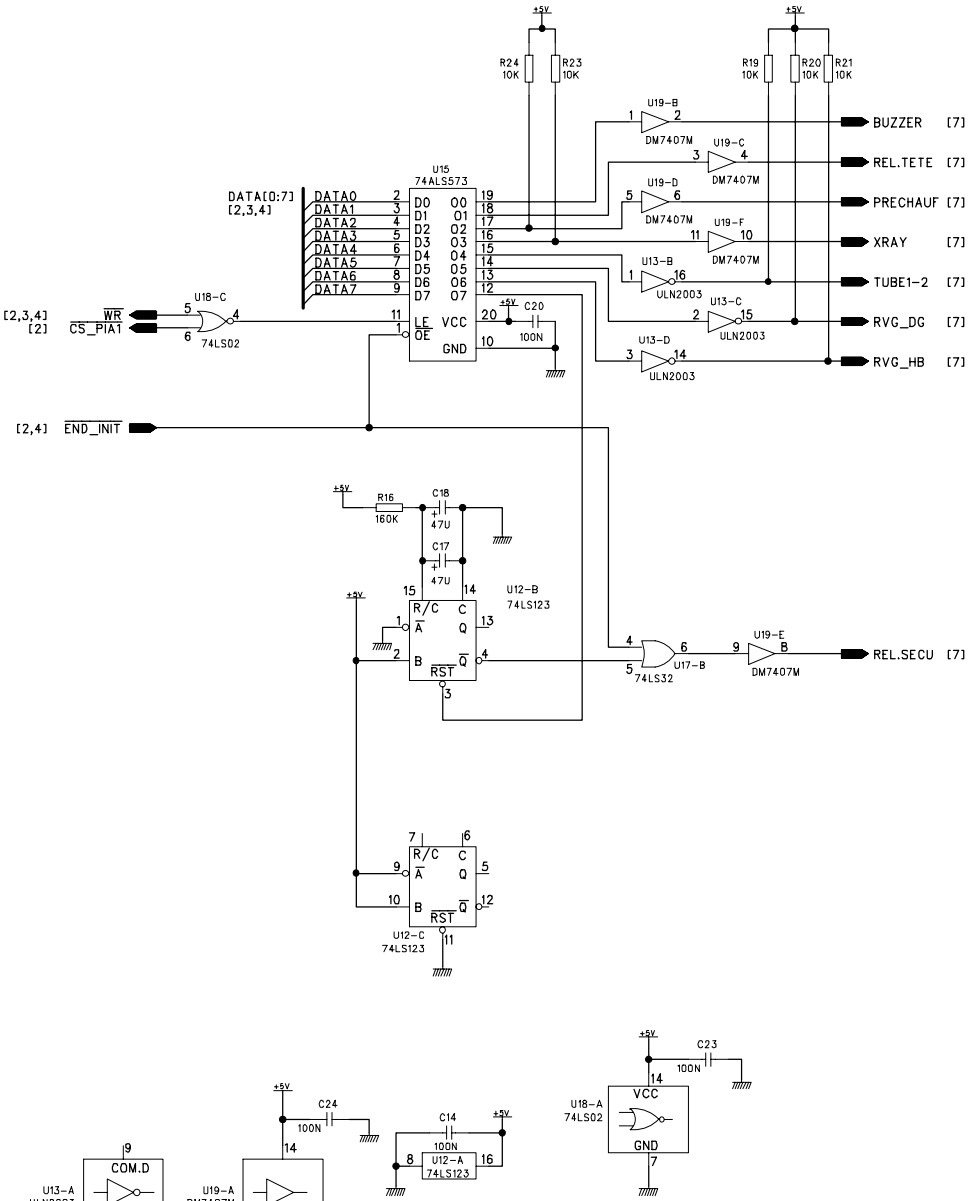


CONFIGURATION



INTERFACE CARTE PUISSANCE



FUNCTION:

.

TROPHY RADIOLOGIE

DRAWING Nr	CODE	Vers	REV	SHEET
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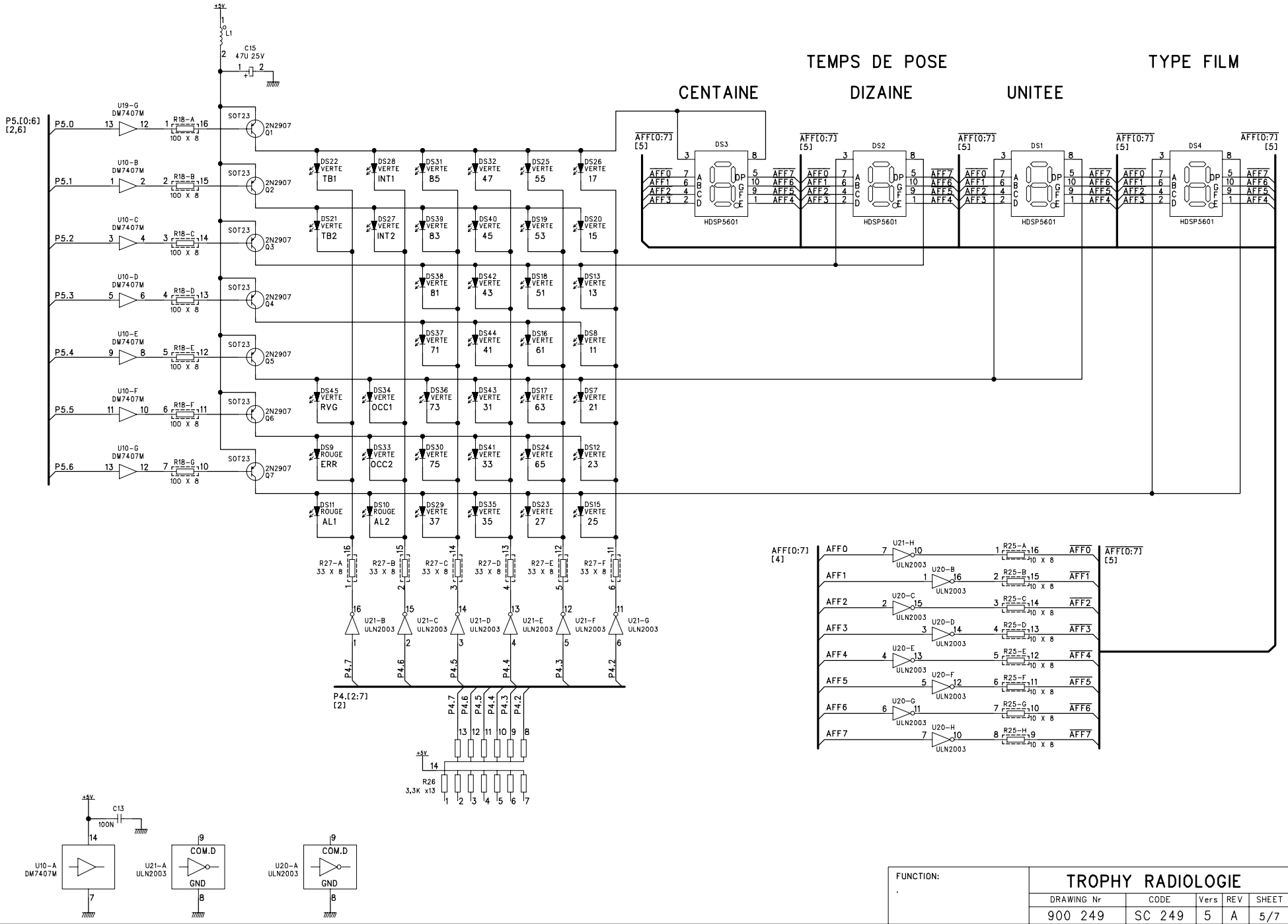

FUNCTION:	TROPHY RADIOLOGIE				
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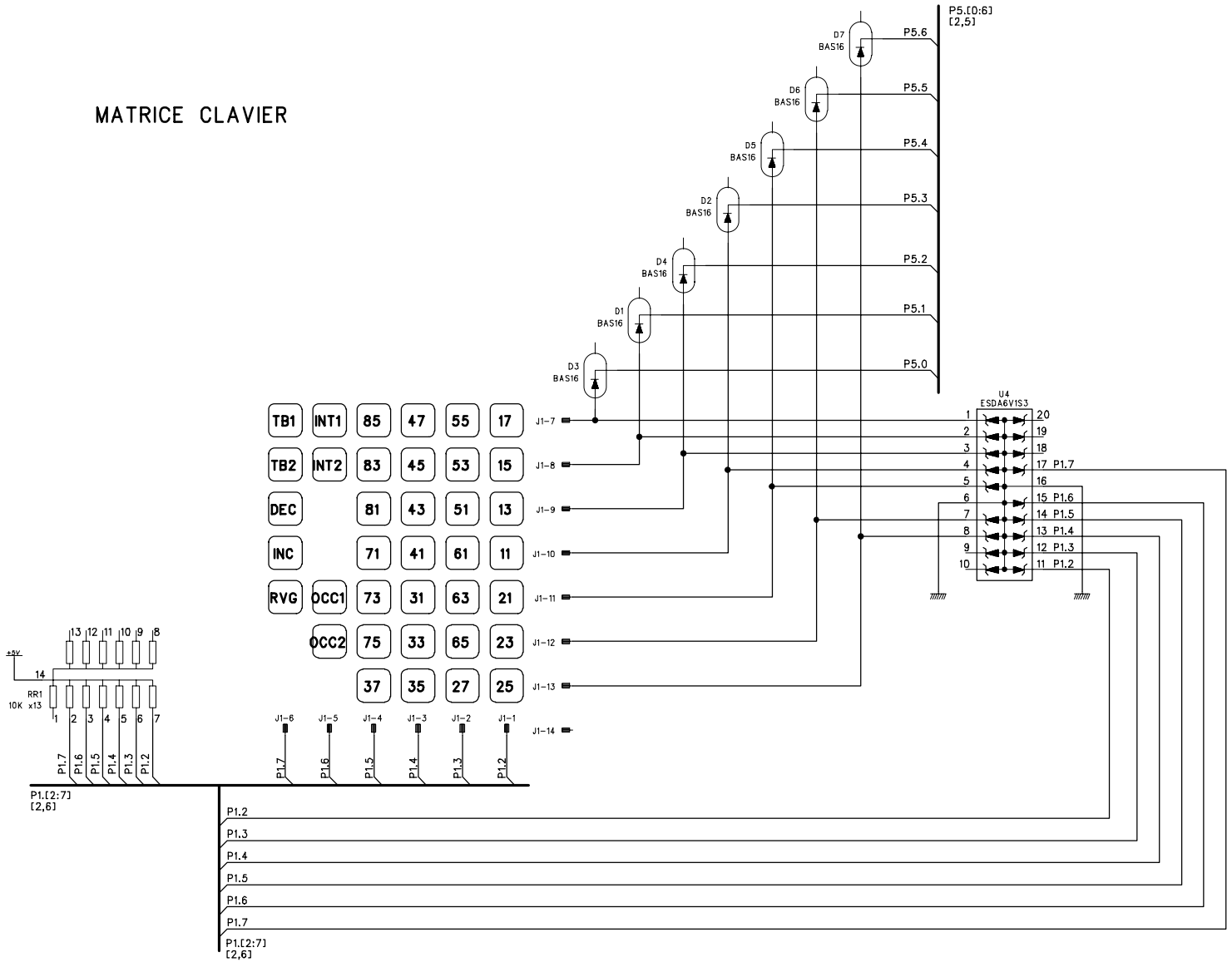
MATRICE CLAVIER



FUNCTION:	TROPHY RADIOLOGIE				
MATRICE CLAVIER	DRAWING Nr	CODE	Vers	REV	SHEET
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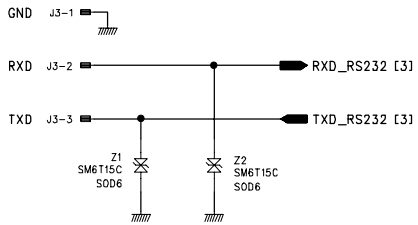
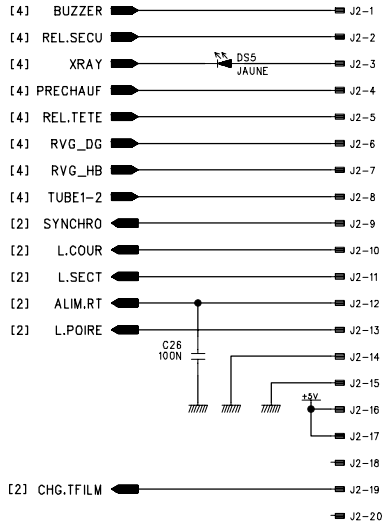
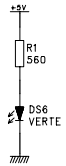






XC1 XC4 XC2 XC3 XC5

X3 X2 X4 X1

FUNCTION:	TROPHY RADIOLOGIE				
.	DRAWING Nr	CODE	Vers	REV	SHEET
	900 249	SC 249	5	A	7/7

CJ 251

CARTE PUISSANCE

CCX

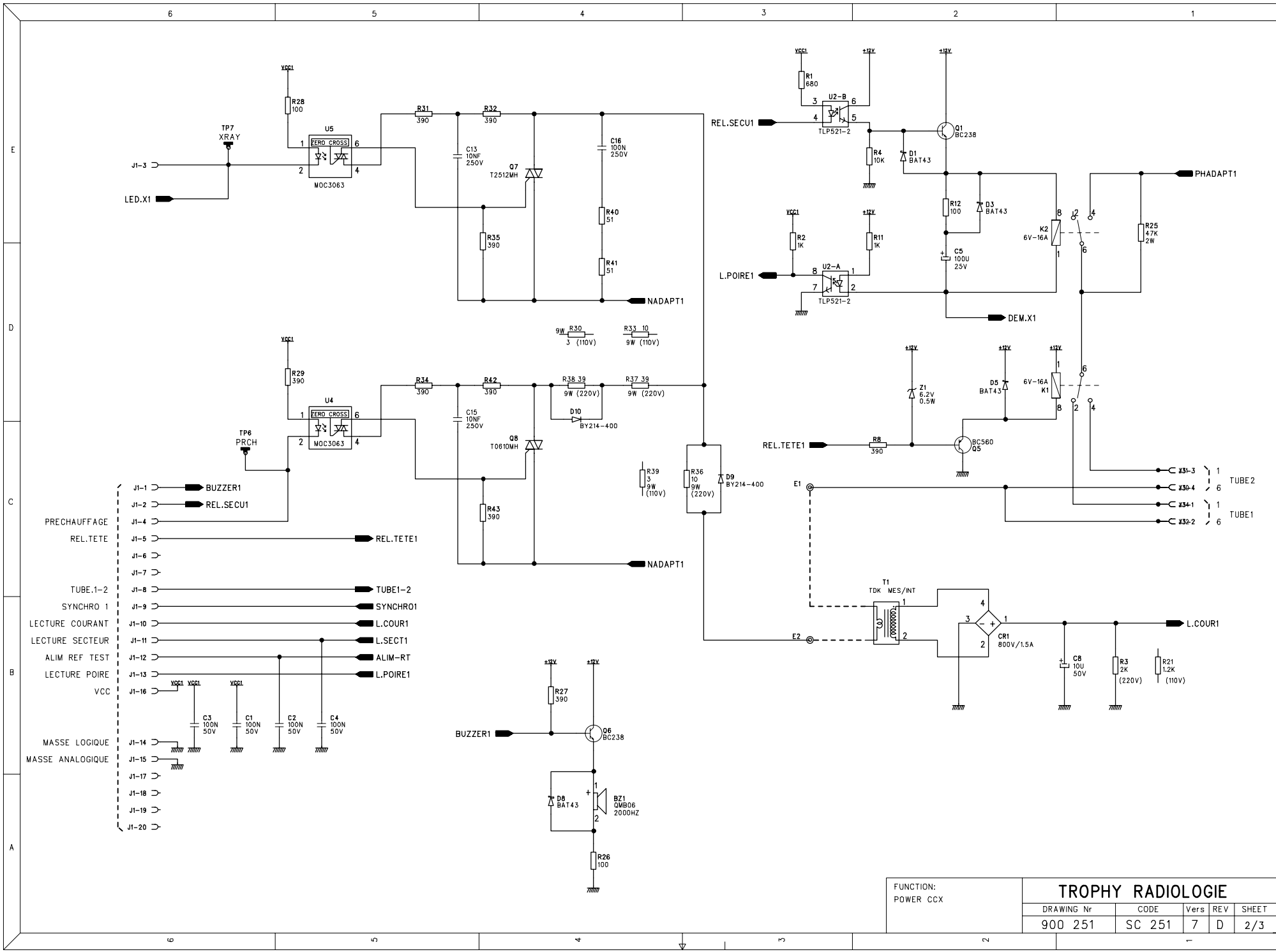
7C	3454	SLY	20/10/98	MODIFICATIONS	ONE
7C	3349	SLY	04/06/98	MODIFICATIONS	ONE
7B	3135	JAN	06/01/98	MODIFICATIONS	ONE
7A	3135	JAN	06/01/98	MODIFICATIONS	ONE
IND	AVIS	DRAW	DATE	MODIFICATIONS	APPR.by

MADE:O. NESME
DATE:20/12/97

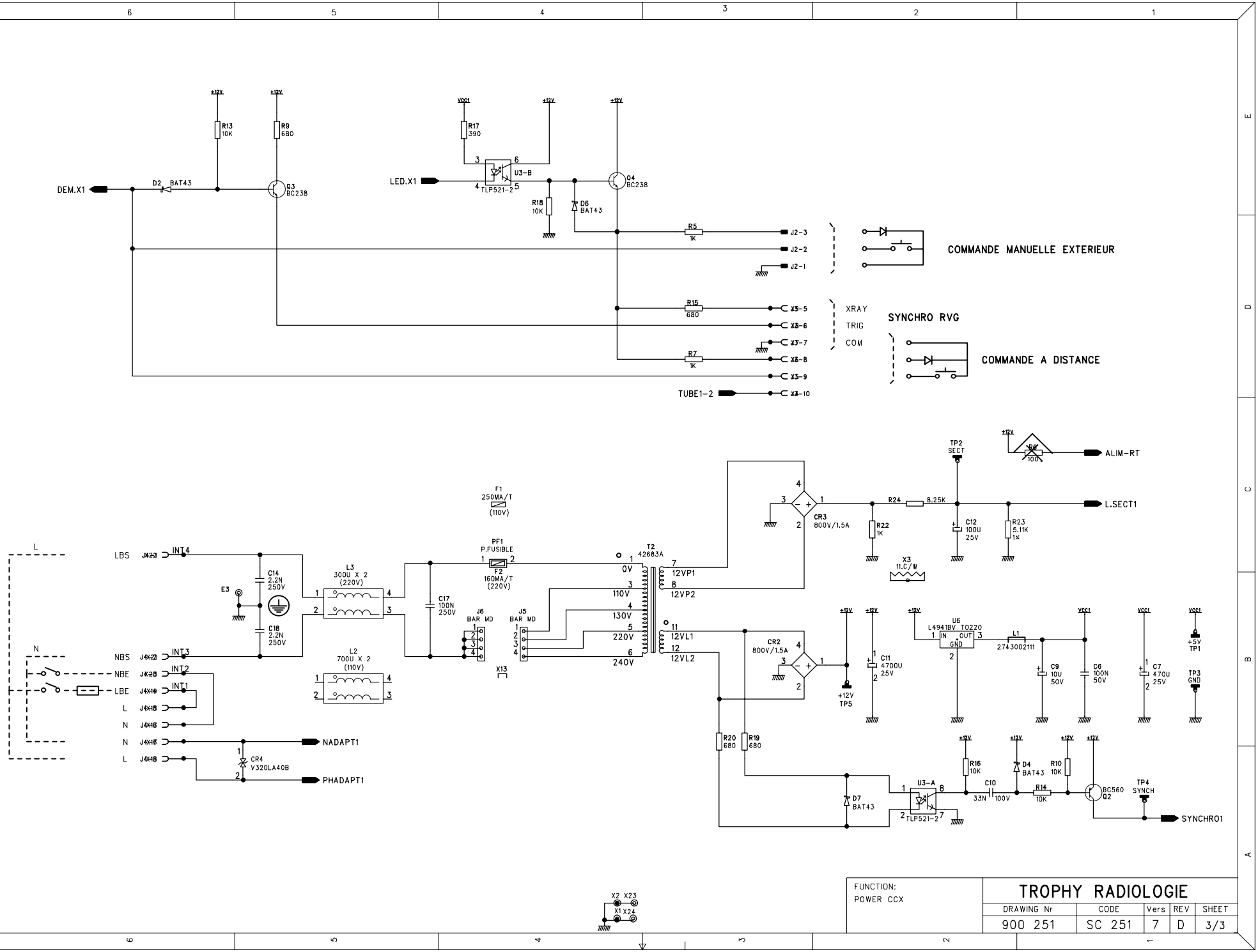
TROPHY RADIOLOGIE

FUNCTION:
BLOC DIAGRAM

DRAWING Nr	CODE	Vers	REV	SHEET
900 251	SC251	7	D	1/3



FUNCTION: POWER CCX	TROPHY RADIOLOGIE				
	DRAWING Nr	CODE	Vers	REV	SHEET
	900 251	SC 251	7	D	2/3



FUNCTION:	TROPHY RADIOLOGIE				
POWER CCX	DRAWING Nr	CODE	Vers	REV	SHEET
	900 251	SC 251	7	D	3/3

Trophy News

Document Ref # : TN0006 / July 2001

DATE:

02 July 2001

From:

MARKETING Department

To:

Sales Managers

Sales Assistants

Order Processing Department

Customer Service

Subsidiaries

Copy:

P. Hipolito
A. Verledens
D. Roudergues
C. Jeanneau
D. Vincent
C. Pourrier

TROPHY PRODUCTS SERIAL NUMBERING SYSTEM

How to read the serial numbers on Trophy products ?

IRIX 70 Intra-Oral X-Ray units

All serial numbers are according to the following numbering system:

Year of Manufacturing	Starts with serial #	Ends with serial #	
1987	G2526	G4100	
1988	G4101	G5919	
1989	G5920	G7850	
1990	G7851	G8846	refer to **(A)**
1991	G8847	G9840	
1992	G9841	G21134	
1993	G21135	G352219	
1994	G401001	G452175	
1995	G501001	G552300	refer to **(B)**
1996	G601001	G652300	
1997	G701001	G752300	
1998 (till July 1st)	G801001	G827300	

Type:
TECHNICAL

Distribution list:

Note (A): This is an incremental numbering system (from 1987 until mid 1993)
Note (B): This is a numbering system based on
1st digit is G for IRIX tubehead
2nd digit is the year of manufacturing (5 is 1995, 6 is 1996, ...)
3rd and 4th digits are the week of manufacturing (from week 01 until week 52)
The 3 last digits are the serial number of the tubehead within the week and year of manufacturing.

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AS OF JULY 1st, 1998,

further to the ISO9001 coming into force, the new IRIX 70 serial numbering system is as following:

" **x x x x xxxx** "

1st digit is the Family of the Product:	X	for Intra-Oral X-Ray unit
2nd digit is the Name of the Product:	A	for IRIX 70 tubehead
	H	for IRIX 70 timer
3rd digit is the Year of manufacturing :	G	for 1992
	H	for 1993
	…	
	O	for 2000
	P	for 2001
	…	
4th digit is the Month of manufacturing:	A	for January
	B	for February
	…	
	L	for December

The 4 last digits are the serial number within the year and month of manufacturing.

Example : **XAMB0128** is the 128th IRIX 70 x-ray tubehead manufactured in February 1998.

Exception: The scissor arm serial number is composed of two digits: **x x**

1st digit is the Year of manufacturing :	G	for 1992
	H	for 1993
	…	
	O	for 2000
	P	for 2001
	…	
2nd digit is the Month of manufacturing:	A	for January
	B	for February
	…	
	L	for December

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Elitys High-Frequency Intra-Oral X-Ray units

From 1994 UNTIL MAY 1999 ONLY,

All serial numbers are according to the following numbering system: " **x x x x xxxx** "

1st digit is the Year of manufacturing :	I	for 1994
	J	for 1995
	K	for 1996
	L	for 1997
	M	for 1998
	N	for 1999
2nd digit is the Month of manufacturing:	A	for January
	B	for February
	…	
	L	for December
3rd digit is the Family of the Product:	X	for Intra-Oral X-Ray unit
4th digit is the Name of the Product:	B	for Elitys tubehead
	I	for Elitys timer

The 4 last digits are the serial number within the year and month of manufacturing.

Example : **LFRD038**: 38th Elitys x-ray tubehead manufactured in june 1997

FROM MAY 1999,

further to the ISO9001 coming into force, the new Elitys serial numbering system is as following: "**x x x x xxxx"**

1st digit is the Family of the Product:	X	for Intra-Oral X-Ray unit
2nd digit is the Name of the Product:	B	for Elitys tubehead
	I	for Elitys timer
3rd digit is the Year of manufacturing :	N	for 1999
	O	for 2000
	P	for 2001
	…	
4th digit is the Month of manufacturing:	A	for January
	B	for February
	…	
	L	for December

The 4 last digits are the serial number within the year and month of manufacturing.

Example : **XAMB0128** is the 128th IRIX 70 x-ray tubehead manufactured in February 1998.

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DIGITAL IMAGING SYSTEMS
RVG – STV - DIGIPAN

All serial numbers are according to the following numbering system: " **x x x x xxxx** "

1st digit is the Year of manufacturing :

G	for 1992
H	for 1993
I	for 1994
J	for 1995
K	for 1996
L	for 1997
M	for 1998
N	for 1999
O	for 2000
P	for 2001
…	

2nd digit is the Month of manufacturing:

A	for January
B	for February
…	
L	for December

3rd digit is the Family of the Product:

R	RVG
S	STV
D	Digipan

4th digit is the Name of the Product:

for the "**R**" Family:

A	RVG (4 - std) HDS size 1 sensor, not CE marked
D	RVG (4 - std) HDS size 1 sensor, CE marked
G	RVG (4 - std) HDS size 1 sensor, Japan, CE marked
I	RVG (4 - std) HDS size 2 sensor, CE marked
J	RVG (4 - std) HDS size 2 sensor,10-meter, CE marked
L	RVG (4 - std) HDS size 1 sensor,10-meter, CE marked
M	RVG (4 - std) ISA Board
N	RVG (4 - std) SCSI board (for RVG Mac box)
O	RVG (4 – std) PCI Board, not CE marked (CJ591)
P	RVG (4 – std) PCI Board, CE marked,with power supply
Q	RVG Reference/UI Size 1 sensor, CE marked
R	RVG Reference/UI Size 2 sensor, CE marked
S	RVG Reference/UI USB board
T	RVG Reference/UI PCI board–w/power supply(CI628R)
U	RVG Reference/UI PCI board (CJ635)
V	RVG Reference/UI Size 1 sensor,10-meter, CE marked
W	RVG Reference/UI Size 1 sensor, Japan, CE marked
X	RVG USB box

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for the "**S**" Family:

A	STV 4 camera, not CE marked
B	STV 4 camera, PAL for video, not CE marked
D	STV 4 camera, CE marked
E	STV 4 camera, PAL for video, CE marked
G	STV PRO camera, PAL, CE marked
H	STV PRO camera, NTSC, CE marked
I	STV PRO PCI board (w/ BT848)
J	STV PRO Video box – PAL
K	STV PRO Video box - NTSC
M	STV 4 ISA Board
N	Frame Grabber ISA Board
O	STV 4 video board – 110V
P	STV 4 video board – 220V
Q	STV 4/PRO PCI board w/o power supply, CE marked
R	Frame Grabber PCI Board (w/ BT848)
S	STV 4 Video box – 110V - NTSC
T	STV 4 Video box – 220V – PAL
V	STV 4 PCI board with power supply, CE marked
W	STV PRO PCI board, CE marked (BT878 – CJ670)
X	Trophy Frame Grabber PCI board (BT878 – CJ671)

for the "**D**" Family:

A	Specific Digipan cassette for Instrumentarium OP100
B	Specific Digipan microprocessor board for OP100
C	ISA PC Interface board for specific Digipan (40MHz)
D	Universal Digipan Cassette for OrthoSlice series
F	ISA PC Interface board for Universal Digipan (32MHz)
YOS	Digipan cassette for Panoura 12
I	Universal Digipan cassette for OP100, Panoura 15/FW
J	Digipan cassette for Siemens OP10
K	PCI PC Interface board for Universal Digipan
L	Digipan cassette for Villa Rotograph 230
M	Digipan cassette for Sirona Orthophos 3, 16
N	Digipan cassette for Planmeca PM2002

Example : **LFRD038**: 38th sensor size 1 manufactured in june 1997

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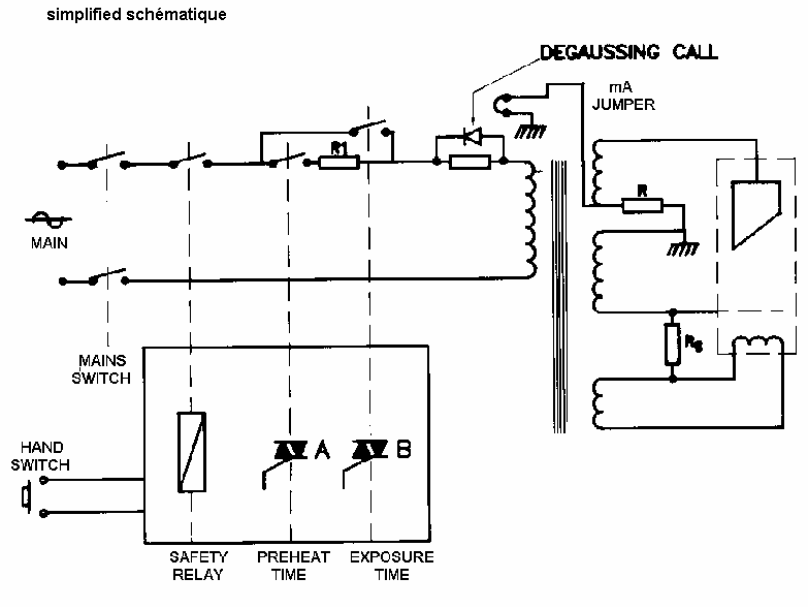
EXPOSURE TIME MEASUREMENT PROCEDURE

IRIX 70 is a single phase self rectified dental X-ray generator, in this generator the heating secondary winding is made on the high voltage transformer (see the following drawing).



SIMPLIFIED OPERATION

DURING PHASE 1 : 5 < > 2Oms

When handswitch is pressed Safety Relay is activated and, power supply sent to triacs.

DURING PHASE 2 : 1 < > 20 ms

The Preheat time is going to start, by activating Triac A.

DURING PHASE 3: 220 mS PREHEAT TIME

Power supply is sent to the X-ray head through two 39 Ω resistors.

A reduced value of the mains supply reaches the head and high voltage to the tube is present .The filament starts to warm up.

During the first 80 ms, filament is still cold, transformer is not loaded by the tube current, there is no electron going to the anode of the tube.

As the transformer is unloaded, high voltage to the tube is quite high (80-90 kV).

As the filament is warming up, some electrons are going to hit the anode with a high kinetic energy emitting a photon with a high frequency (hard X-ray). In fact the first peak detected by NERO. At that time tube current is a few µAmp (microamps).

Because of the resistive characteristics of an high voltage transformer, there is quite a big difference between high voltage loaded or unloaded. This is the first reason which makes the kV drop. This drop is increased; and

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increasing drop of voltage through R1 while the consumption of the head is higher due to a warmer filament and a larger tube current. Filament is still warming up. Exposure time is going to start by activating TRIAC B.

DURING PHASE 4 : EXPOSURE TIME

Mains voltage is sent to the X-ray head by activating triac B (shorting R1). Filament is not hot enough to deliver the 8mA during the first 60 - 100 mS of exposure time, and this makes the kV higher than nominal value. Once the filament has reached its temperature, kV is stabilised around the nominal KV value for the complete remaining duration of exposure.

DURING PHASE 5 : 5 < > 20 ms

The two triacs A, B are opened and no voltage is applied to the tube head, no more X-rays are emitted.

Safety relay will fall down 5 < > 20 mS.

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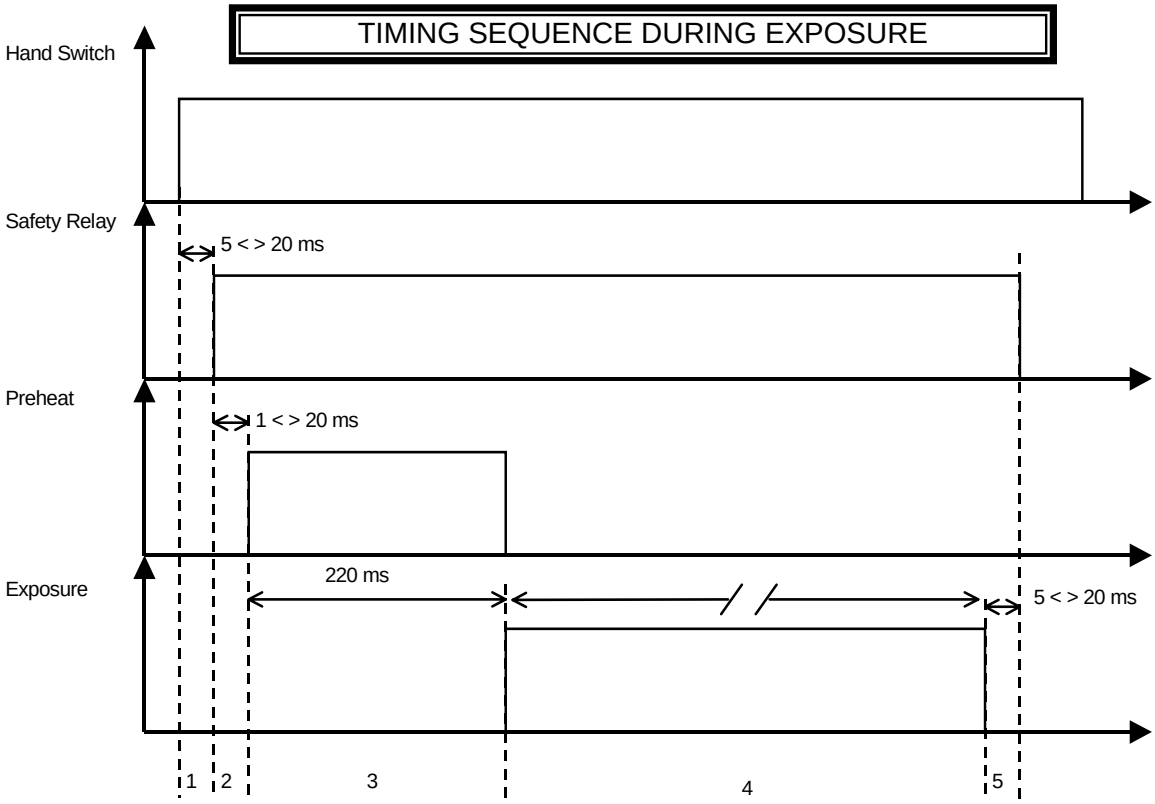
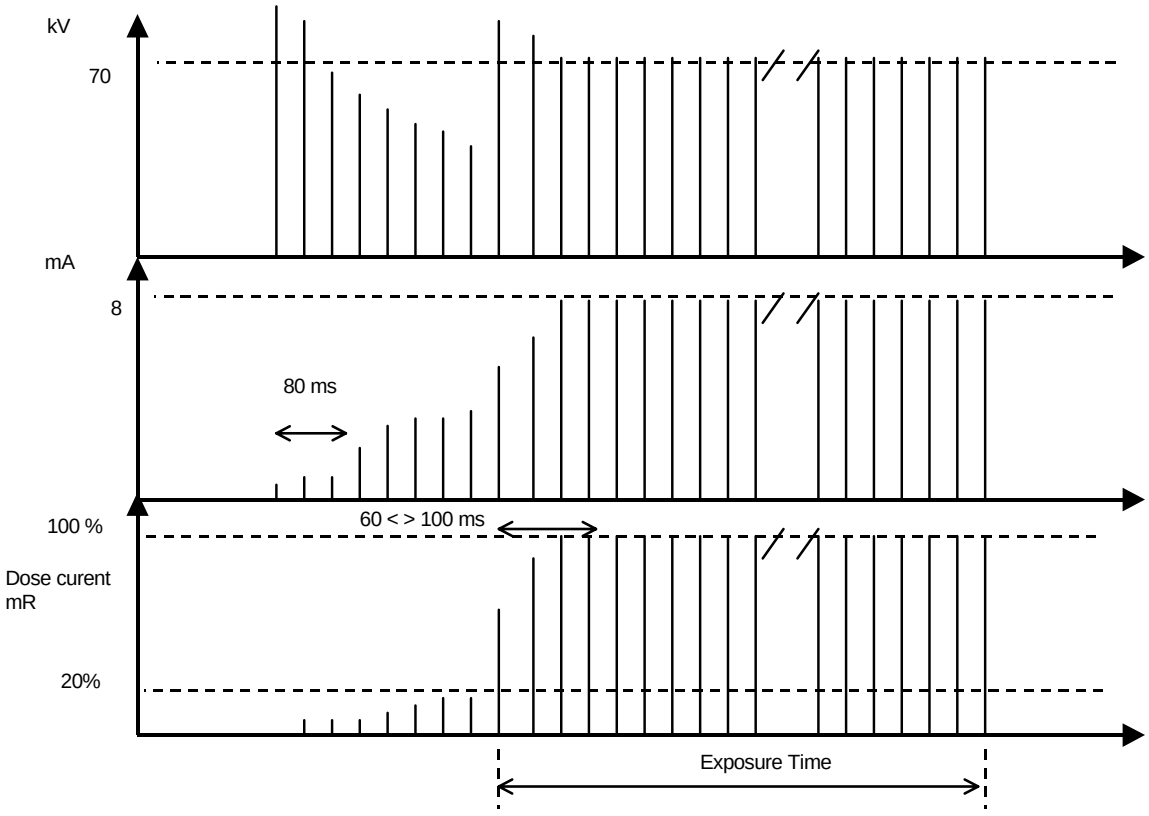
TROPHY

IRIX 70 Inspection

TIMING SEQUENCE DURING EXPOSURE





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In this case during the preheat a low radiation is generated (see the following curve), usual mesasuring devices detect the kVp and low radiation during this time.

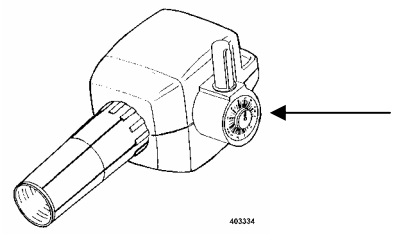
Because the exposure time is calculated on the kVp, the time measured is false.

1 - For measuring the exposure time you can use the method proposed by IEC 601-2-7 (1987) :

With a dosimeter and oscilloscope you count the number of cycles greater than 20% of the maximun value of the dose rate and multiply by 20 ms in 50 Hz or 16.6 ms in 60 Hz.

2 – or you can use the method proposed by IEC 601-2-7 (1998) :

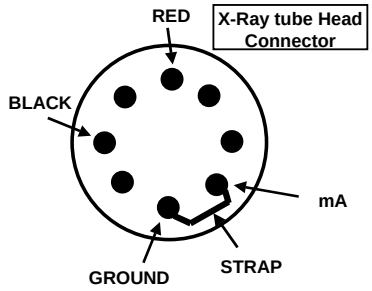
With an oscilloscope you count the number of cycles greater than 25% of the maximun value of the mA rate and multiply by 20 ms in 50 Hz or 16.6 ms in 60 Hz.



Remove the angle cover

Unplug the mA strap.

Connect probe between Ground and mA (1 mA = 10 V).



connect the ground of the scope to the ground terminal

On the next pages you can find the curves and an extract of the international standard [Old IEC 601-2-7 (1987) and the new IEC 601-2-7 (1998)]

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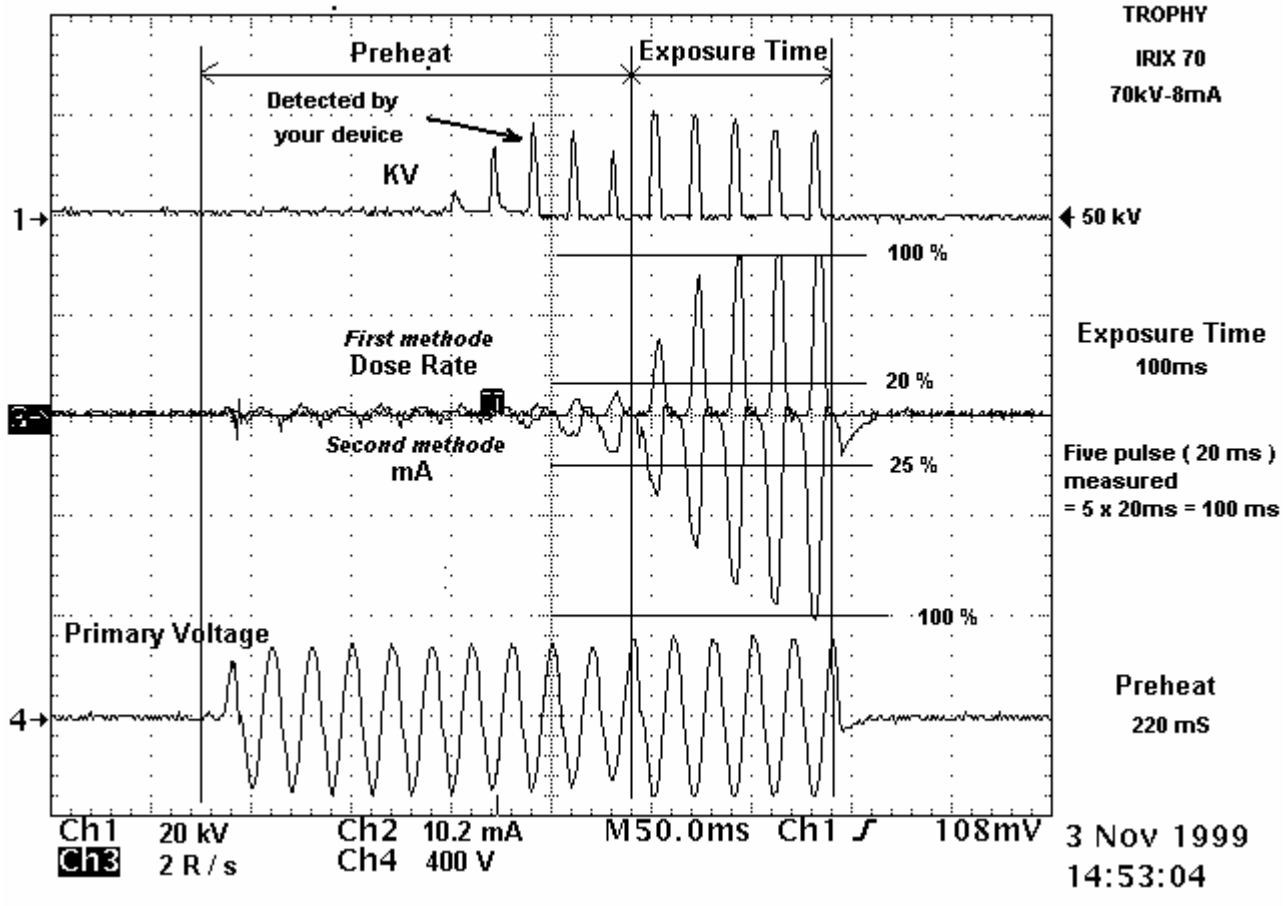
TROPHY

IRIX 70 Inspection



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50.105.2 *Special LOADING FACTORS for tests*

If for a HIGH-VOLTAGE GENERATOR the combinations of values of LOADING FACTORS required for the tests in Sub-clauses 50.105 and 50.114 do not fall within the SPECIFIED RANGE OF COMPLIANCE, other appropriate combinations of values shall be specified.

In such cases, the combinations of LOADING FACTORS used for the test shall be given in the ACCOMPANYING DOCUMENTS.

50.105.3 *Indicated values*

If values of LOADING FACTORS are indicated in values chosen from a series R'10 according to the note in Item a) of Sub-clause 50.1.101, compliance may have to be determined in relation to the corresponding theoretical (calculated) values of the series, see Item a) of Sub-clause 50.1.101 and Appendix AA.

50.106 *Methods of measuring LOADING FACTORS*

50.106.1 *Method of measuring X-RAY TUBE VOLTAGE*

In general, the X-RAY TUBE VOLTAGE shall be measured in the high voltage circuit.

If the high voltage circuit is not accessible for the measurement, the PERCENT AVERAGE ERROR may be determined using a method based upon the measurement of RADIATION QUALITY (for example: penetrameter, spectral analysis).

The method used for measuring the X-RAY TUBE VOLTAGE shall be described in the ACCOMPANYING DOCUMENTS.

50.106.2 *Method of measuring X-RAY TUBE CURRENT*

In general, the X-RAY TUBE CURRENT shall be measured in the rectified high voltage circuit of the HIGH VOLTAGE GENERATOR.

The method used for measuring the X-RAY TUBE CURRENT shall be described in the ACCOMPANYING DOCUMENTS.

50.106.3 *Method of determining LOADING TIME*

Generally the LOADING TIME shall be determined as time interval between:

- *the time that the potential difference in the high voltage circuit has risen the first time to a value above 65%, but not higher than 85%, of the peak value and*
- *the time at which it finally drops below the same value.*

For terminating systems providing electronic control in the high voltage circuit by means of a grid in an electronic tube or in the X-RAY TUBE, the LOADING TIME may be determined as the time interval between the instant the timing device generates the signal to start the LOADING and the instant it generates the signal to terminate the LOADING.

In ONE and TWO PEAK HIGH VOLTAGE GENERATORS, instead of LOADING TIME the IRRADIATION TIME may be determined by measuring the number of cycles or half cycles in which a significant quantity of X-RADIATION is produced. In this case the method used shall be described in the ACCOMPANYING DOCUMENTS.

old IEC 60127 (1987)

2.101.1 Operating conditions for NOMINAL X-RAY TUBE VOLTAGE

NOMINAL X-RAY TUBE VOLTAGE is defined in IEC 60788 (rm-36-03) as the highest permitted X-RAY TUBE VOLTAGE for specific operating conditions. In this standard, if specific operating conditions are not stated, it is to be assumed that the value referenced is unconditional and is thus the highest X-RAY TUBE VOLTAGE permitted for NORMAL USE of the item under consideration. Such a value cannot be higher, but is sometimes lower, than values permitted for certain separate subassemblies or parts of the item.

2.101.2 PERCENTAGE RIPPLE IN CONSTANT POTENTIAL HIGH-VOLTAGE GENERATORS

Unless otherwise stated, it is to be assumed that for a HIGH-VOLTAGE GENERATOR to be regarded as a CONSTANT POTENTIAL HIGH-VOLTAGE GENERATOR, the PERCENTAGE RIPPLE of its output voltage (under the relevant conditions) does not exceed 4.

2.101.3 RADIATION QUANTITY for NOMINAL SHORTEST IRRADIATION TIME

The definition of NOMINAL SHORTEST IRRADIATION TIME refers to a required constancy of a RADIATION QUANTITY. In this standard the RADIATION QUANTITY concerned is AIR KERMA.

2.101.4 IRRADIATION TIME

Generally the IRRADIATION TIME is measured in terms of LOADING TIME as the time interval between:

– the instant that the X-RAY TUBE VOLTAGE has risen for the first time to a value of 75 % of the peak value; and

– the instant at which it finally drops below the same value.

For systems in which LOADING is controlled by electronic switching of the high voltage, using a grid in an electronic tube or in the X-RAY TUBE, the LOADING TIME may be determined as the time interval between the instant when the TIMING DEVICE generates the signal to start the IRRADIATION and the instant when it generates the signal to terminate the IRRADIATION.

For systems in which LOADING is controlled by simultaneous switching in the primaries of both the high-voltage circuit and the heating supply for the filament of the X-RAY TUBE, the LOADING time shall be determined as the time interval between the instant when the X-RAY TUBE CURRENT first rises above 25 % of its maximum value and the instant when it finally falls below the same value.

NEW IEC 60127 (1998)

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